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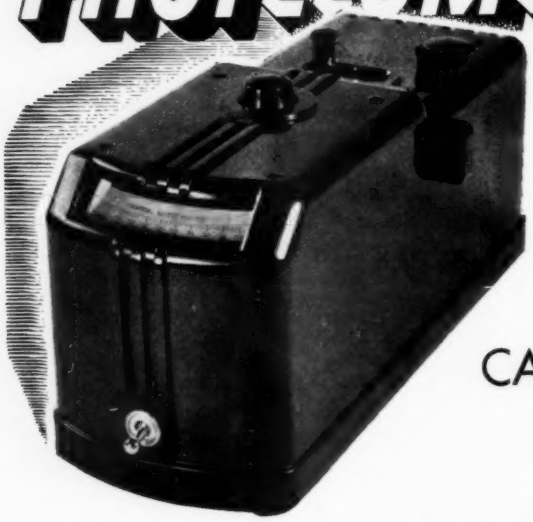

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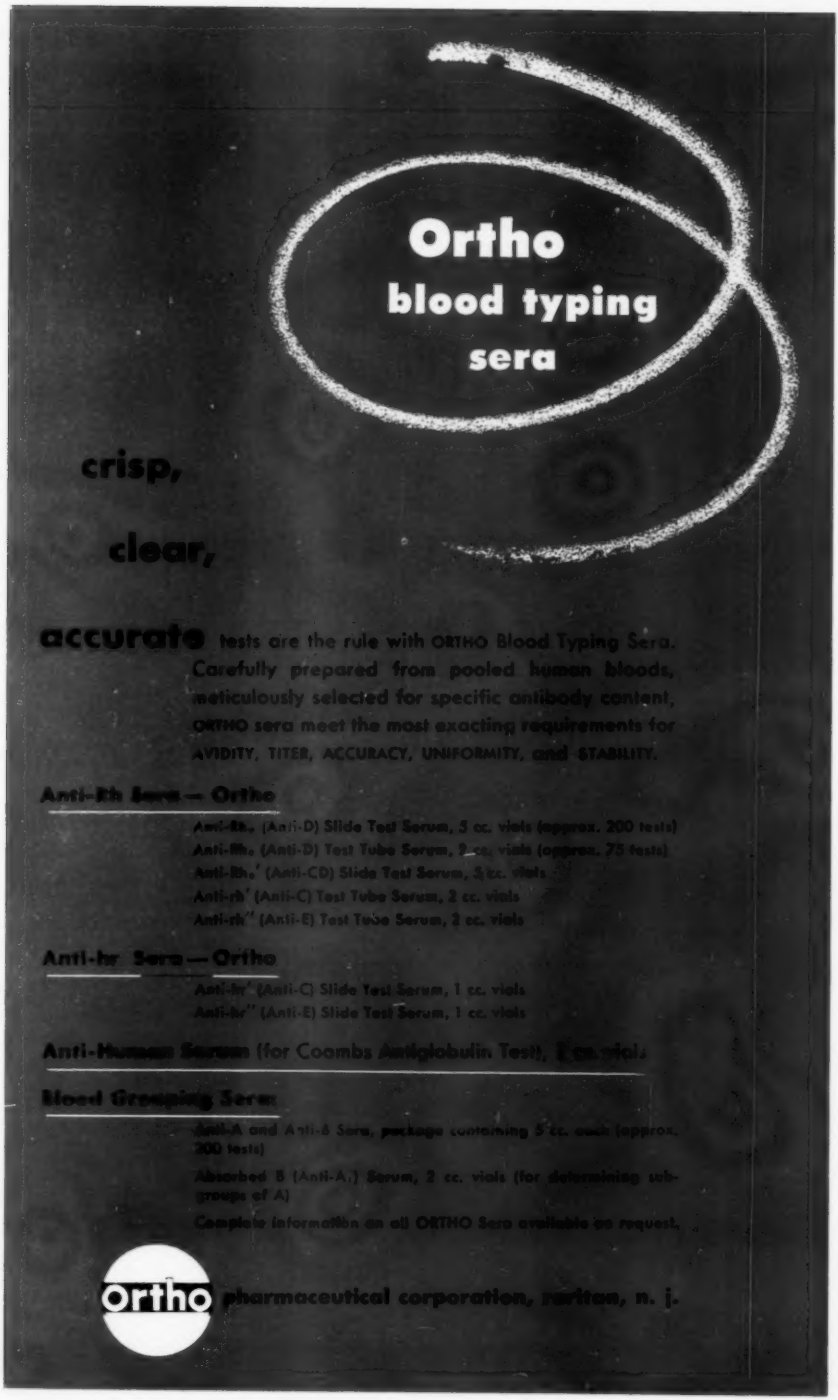
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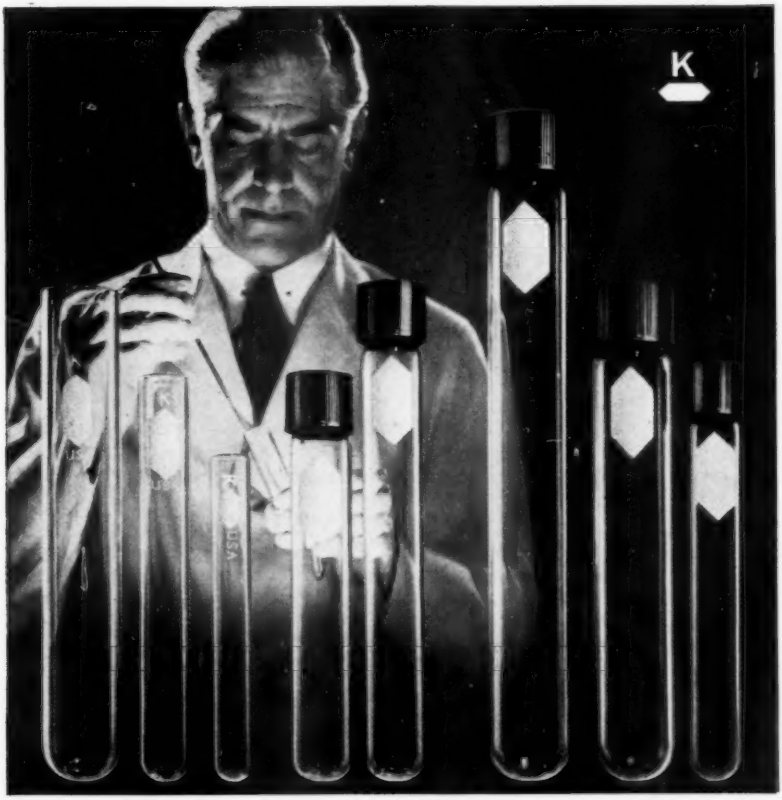

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Registered technologist, with qualities of leadership, to serve as chief technologist, large general hospital; residential town, short distance from New York city. MT3-7.

Laboratory technicians; college graduates with majors in physics or mathematics; duties consist of working in school of radiological physics; teaching center; Midwest. MT3-8.

Laboratory technologist, registered in California; small hospital; college town, Southern California. MT3-9.

Chemistry technician (M.S. preferred; candidate with B.S. and experience eligible) and, also, tissue technician; 250-bed general hospital; college town, 100,000, near Chicago. MT3-10.

Technologist, well trained in bacteriology and serology also, hematology technician; medical school laboratory; East. MT3-11.

Technician qualified in x-ray and laboratory work; should be particularly well trained blood chemistry; office of American Board Surgeons, FACS; California. MT3-12.

Technologist; medical school laboratory of clinical investigation; West. MT3-13.

Research technician; degree, training in chemistry or biochemistry desirable; office of American Board surgeon; Chicago area. MT3-14.

Chief medical technologist; fairly large hospital; $300, maintenance; Florida. MT3-15.

Laboratory technologist to take charge of department, under supervision of visiting pathologist; modern well equipped hospital of small size; minimum $300, maintenance; Chicago area. MT3-16.

Hematology technician; one of California's leading hospitals. MT3-18.

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Biochemist and bacteriologist, Ph.D's; large hospital; winter resort town, South MT3-20.

Chemistry technician; 100-bed hospital; resort area; Northwest; $325-$350. MT3-21.

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BIBLIOGRAPHY

Joslin, E. P., et al: Treatment of Diabetes Mellitus—8 Ed., Phila., Lea & Febiger, 1946—P. 241, 247.

Lowsley, O. S. & Kirwin, T. J.: Clinical Urology—Vol. 1, 2 Ed., Balt., Williams & Wilkins, 1944—P. 31.

Duncan, G. G.: Diseases of Metabolism—2 Ed., Phila., W. B. Saunders Co., 1947—P. 735, 736, 737.

Stanley, Phyllis: The American Journal of Medical Technology—Vol. 6, No. 6, Nov., 1940 and Vol. 9, No. 1, Jan., 1943.

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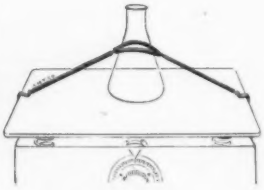

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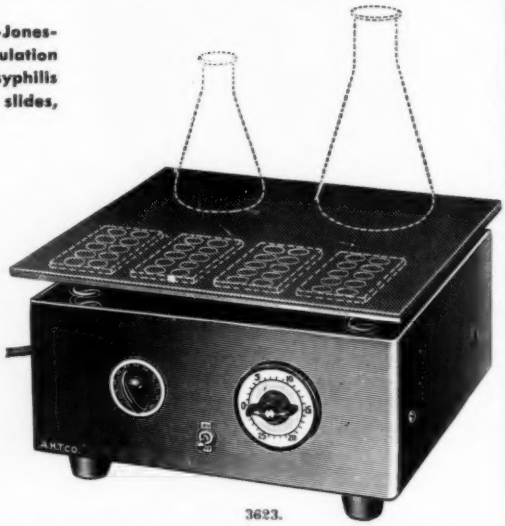

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A STUDY OF ASPIRATION OF BONE MARROW

By JANE MAGHAN, M.T. (ASCP)
St. Marys Hospital, Duluth, Minnesota

The bone marrow is the largest organ in the body. This marrow in all bones has a volume of about 1400 c.c. It comprises from 3.4 to 5.9% of the total body weight, or almost twice that of a normal liver.

The normal marrow is always red in the flat and short bones, such as skull, ribs, sternum, clavicles, vertebrae and pelvic bones, due to active hematopoesis. But in its simplest form the bone marrow contains only three groups of cells: endothelial, reticular, and fat cells.[9] This is the condition of the yellow marrow filling the shafts of the long bones in adult life. This yellow marrow has the capacity of rapid transformation into active (red) marrow with its production of the granulocytic and erythrocytic series. The cells of the granulocytic series are formed extravascularly in the reticular tissue and the erythrocytes intravascularly from the endothelial lining of the sinusoids. The inactive yellow bone marrow thus forms an immense reserve for emergency blood cell propagation.[9]

The functions of the bone marrow are among the most important in the body. The erythrocytes, leukocytes, and platelets, which are all formed in the marrow, are very essential to life. The erythrocytes supply oxygen and carbon dioxide to every cell in the body. The leukocytes guard against infection and the platelets by the activity in clot formation prevent hemorrhage.[1]

For many years the bone marrow was studied only at autopsy. Then it was discovered that small pieces could be trephined out of the sternum for microscopic sections. But this required surgical technique. In 1929 Arinkin first described a method of puncturing the sternum with a needle and aspirating bone marrow. Aspiration of bone marrow for biopsy is now generally accepted as a valuable aid in the diagnosis of diseases affecting

the hematopoetic system.[2] The advantages of this aspiration method are safety, simplicity; and the cell morphology is excellently preserved.

The workers who first used this method were content with direct smears. Notable advance in technique reported by Scheicher and Sharp in 1937 and by Limarzi was the concentration of the marrow by centrifuging before making smears.

The site of the puncture in the sternum is usually in the midline between the second and third interspaces. The sternum is used because it is readily accessible and the qualitative and quantitative conditions in the sternum are accurate reflections of conditions prevailing in other sites of hematopoesis.[2] It is not the only site that can be used for aspiration. The iliac crest is sometimes used. In infants, where the sternum is so thin, the femur or upper end of the tibia are sites of puncture.

A valuable contribution to technique has been the recent re-emphasis of the value of using imprints and sections from the small particles of solid marrow material usually found in a successful aspiration. Dr. Berman states the reason for using imprints is that cells of primitive type which tend to be present in masses or clusters are not always present in the fluid material but remain in cell masses in the solid particles. The value of the sectioned material is shown by the discovery of focal lesions, such as miliary tuberculosis, lymphoblastoma, metastatic tumors; and also by the demonstration of anatomic structures such as blood vessels, sinusoids, and lymphoid nodules, rarely seen in smears.[2]

In reviewing the techniques of several authors, Drs. Berman and Axelrod[3] presented what seems to be the simplest method for obtaining smears, imprints, volumetric readings and histologic sections from a single aspirated specimen from the sternal bone marrow.

This procedure is described with the modifications which they found to be of greatest practical value. The skin over the site of puncture on the sternum is prepared with antiseptic solution. The skin, subcutaneous tissue, and periosteum are infiltrated with a local anesthetic. The aspiration needle is forced into the sternum with steady pressure and slight rotation with the needle at right angle to the surface. After the needle is firmly embedded in the medullary cavity, the stylet is withdrawn and a syringe is attached to the needle head. The plunger is slowly withdrawn until the first drop of fluid is seen in the end of the syringe. The syringe is detached and the stylet replaced and that first drop expressed onto a clean slide. Several smears are made and quickly air-dried. Since these smears did not come into contact with anticoagulant, they are of greater value for studying cytologic detail. The syringe is re-attached and 1.5 c.c. of marrow

aspirated. The specimen is immediately placed in a paraffin-lined vial containing a minute amount of heparin and gently rotated. One c.c. is placed in a Wintrobe hematocrit tube and centrifuged at 2,000 r.p.m. for five minutes. The marrow specimen is thus separated in four layers: fat, plasma, nucleated cells or the myeloid-erytroid layer, and erythrocytes. The volume of each is recorded in "volume per cent."

A clean slide is prepared for the collection of the gross marrow particles. A small amount of powdered topical thrombin is placed on the slide, mixed into solution with a drop of water and allowed to dry. The gross marrow particles are collected from the remaining material, from among those adhering to the barrel of the syringe, and the wall of the vial. They are transferred to this thrombin-coated area, usually with an applicator. Several rows of imprints are made on clean slides with one or two of the particles, as described by Schleicher. After the marrow particles are collected and placed on the prepared area, they are gently manipulated until they are in contact. To this are added 3 or 4 drops of the heparinized plasma from the centrifuged marrow. The plasma clot, which includes the mass of marrow particles, is now a firm mass which can be easily lifted from the slide and dropped into a vial of fixing solution. This mass is used for preparing histologic sections.

A set of smears is made from the nucleated cell layer of the hematocrit. These smears are used for differential counts. They may be stained very successfully with Wrights Stain.[3]

The study of bone marrow may aid in diagnosis, prognosis and treatment. Bone marrow study aids in the diagnosis of Aplastic anemia, the leukemias, multiple myeloma, Gaucher's disease, but is of greater value in hematologic conditions with few or no changes in peripheral blood, leukopenic states, thrombopenic states, and anemic states.

In aplastic anemia, the usual marrow findings are a generalized aplasia of the erythroid, granular, and megakaryocytic bone marrow cells. The peripheral blood reflects the total damage done to the bone marrow. There is anemia, leukopenia, neutropenia, and thrombocytopenia.

The plasma cells found in multiple myeloma definitely establish the diagnosis. Some authors feel that over 6% plasma cells is diagnostic.[4]

There is hyperplasia of the granular cells, especially the myelocytes, in chronic myelogenous leukemia. In the acute stage of myelogenous leukemia, the marrow shows an almost complete replacement of the marrow by myeloblasts.[1]

Infiltration by small lymphocytes characterizes the marrow

picture in chronic lymphatic leukemia. There are some mature lymphocytes in the acute stage, but the predominating cell is the lymphoblast.

The marrow picture in polycythemia vera is quite normal. However, there is a significant increase in the segmented cells and the nucleated red cells, particularly erythroblasts. Diagnosis is suggested if these erythroblasts exceed 20 per 100 white cells, the reticulocyte count is over 2%, and the myeloid-erythroid ratio is below 3:1.[5]

Thrombocytopenic purpura may be of two types. The one in which the platelets are destroyed by an overactive spleen and the marrow shows a hyperlasia of megakaryocytes. The platelets in the other are diminished because of injury to the megakaryocytes in the bone marrow by some pathologic process, resulting in diminished megakaryocytes in the marrow.

In hemophilia the megakaryocytes are increased, but morphologically normal. They have an accelerated rate of maturation and platelet formation.[6]

The marrow picture in pernicious anemia is one of marked absolute increase in megaloblasts during relapse, and the rapid conversion to normoblastic marrow after treatment.[4]

Myeloid stimulation predominates the picture in secondary anemias, plus a normoblastic erythropoesis.[4]

An important diagnostic feature in hemolytic anemia is the presence of nucleated red cells in excess of 50% of all nucleated cells. There are more normoblasts and less erythroblasts.[7]

Iron deficiency anemia shows a marrow picture with an excess of nucleated red cells, largely normoblasts and few, if any, megaloblasts. The predominant characteristic cell is a small mature polychromatic normoblast having jagged cell outline with a small rim of slate-grey cytoplasm. When this dominates in erythropoesis, iron deficiency may be inferred.[7] A method for estimating iron stores in sternal punctures has been described by using a Hemosiderin stain. The presence or absence of iron in the marrow may be regarded as an index of need of iron therapy in anemia.[8]

In agranulocytosis the bone marrow shows granular cells arrested at the myelocyte stage.[1]

The marrow findings in some pathological conditions have been briefly reviewed. In the diseases which have been mentioned, the aspiration of bone marrow is a definite aid in diagnosis. However, in aplastic anemia and some cases of myelophthisic anemias, the diagnosis cannot always be established by aspiration biopsy of the bone marrow. This is particularly true when the anemia is caused by Hodgkin's disease or metastatic carcinoma. In these situations, little or no material may be aspirated for an examination and a trephined button of bone

marrow prepared by paraffin section may afford the necessary information.

A technique has been reviewed whereby a single aspirated specimen of sternal bone marrow will yield material for smears, imprints, volumetric data, and histologic sections.

The following slides will show the marrow pictures of some cases diagnosed by sternal aspiration.

ACKNOWLEDGMENT

The kodachrome slides shown in conjunction with this paper were taken by Drs. Wm. Knoll and John Wolff of the pathology department of St. Mary's Hospital, Duluth, Minnesota.

REFERENCES

1. Reich, Carl: A Clinical Atlas of Sternal Bone Marrow, Chicago, Ill., Abbott Laboratories, 1947.
2. Berman, L.: Techniques used in study of aspirated sternal marrow. Am. J. Clin. Path. 17:631-636, Aug., 1947.
3. Berman, L., and Axelrod, A. R.: Aspiration of sternal marrow. Technique for observing volumetric readings, smears, imprints, and histologic sections. Am. J. Clin. Path. 17:61-66. 1947.
4. Lucia, S. P., and Hunt, M. L.: Significance of myeloid maturation curve in material aspirated from sternal marrow. Am. J. Med. Sc. 213:686-693. June, 1947.
5. Manning, I. H., Jr.: Diagnostic value of sternal puncture in polycythemia vera. Am. J. Med. Sc. 214:469-475, Nov., 1947.
6. Limarzi, L. R.: Bone marrow in Hemophilia. J. Lab. and Clin. Med. 31:777-784, 1946.
7. Wolman, J., and Dickstein, B.: Clinical application of examination in childhood. Am. J. Med. Sc. 214:677-687, Dec., 1947.
8. Rath, C. E., and Finch, C. A.: Sternal Marrow Hemosiderin. Method for determination of available iron stores in man. J. Lab. and Clin. Med. 33:81-86, Jan., 1948.
9. Haden, Russell L.: Principles of Hematology, pp. 9-49. Philadelphia, Lea & Febiger, 1940.

A COMPARATIVE STUDY OF THE SPINAL FLUID AND BLOOD FINDINGS IN POLIOMYELITIS AND SAINT LOUIS ENCEPHALITIS*

By SISTER MARY DOLOROSA POPE, S.S.M., M.T.
1325 So. Grand Blvd. Firmin Desloge Hospital, St. Louis 4, Mo.

During the past twenty years Saint Louis has experienced the fear and tragedy of two very severe epidemics. The largest epidemic of poliomyelitis in the history of the United States occurred in 1949, and the epidemic was no less lenient in Saint Louis than in many other large cities of the country. The epidemic of acute Saint Louis Encephalitis made its appearance in the Saint Louis area in the late summer of 1933, and marked the first appearance in the United States of this disease in epidemic proportions.

* Presented at the Annual Convention of the American Society of Medical Technologists, Houston, Texas

The epidemic of poliomyelitis claimed its first patients in March of 1949. In the beginning there were a few isolated cases, but the number increased rapidly until the peak was reached in August, 1949. The cases then slowly decreased until the beginning of October and after that there were isolated cases until December, 1949. The Saint Louis Public Health division recorded 639 resident cases during this time. It is impossible to estimate accurately the number of cases which occurred during these months because many of the abortive and non-paralytic types of poliomyelitis were mild and not reported or hospitalized. It is often stated that for every case of paralytic poliomyelitis during an epidemic there are from 50 to 100 mild, non-paralytic cases which are treated at home and not reported.

Poliomyelitis is a common, acute infection which only occasionally is associated with clinical evidence of central nervous system involvement. The abortive form is much more common than the paralytic or non-paralytic type. Doctor Dorothy Horstmann, in an article entitled "Clinical Aspects of Acute Poliomyelitis," published in *The American Journal of Medicine* in May, 1949, states that the number of abortive cases has been underestimated, and that they may outnumber the others twenty to one as determined by Sweetman in England; or even several hundred to one as estimated in a recent epidemic in New Zealand.

POLIOMYELITIS

During the first few weeks of the poliomyelitis epidemic, many of the patients did not show signs of paralysis, but did show definite meningeal encephalic symptoms such as: an increased number of white cells in the spinal fluid, vomiting, stiff neck and headache. This made the diagnoses highly difficult and raised the problem as to whether we were dealing with a second epidemic of Saint Louis Encephalitis, or with a poliomyelitis epidemic. The first symptoms in these poliomyelitis patients were often so mild as to be discounted by parents. Listlessness, fever and stiff neck were often the common symptoms for the first few days. This is often called the first phase. The interval of well being before the onset of the second phase occurred within one to six days following the first phase. The onset of these symptoms was sudden fever, headache and vomiting. The headaches were frontal, occipital or temporal, and often severe and pounding. A complaint of sore throat was common in the second phase. These symptoms were quickly followed by spontaneous pain in the extremities, and soreness and stiffness of the neck and back. The soreness and stiffness of the back was usually in the lumbar region, and between the shoulders. The onset of weakness or paralysis was common while the fever was still present, or it appeared when the fever began to subside,

and he felt himself on the road to recovery. Then he suddenly discovered that he could not use his arms and legs normally.

ENCEPHALITIS

During the 1933 epidemic of Saint Louis Encephalitis, over 1,100 cases were reported to the Saint Louis Health Division within a space of four months, from July 1 to November 1. Epidemics of encephalitis had been occurring in Japan for nearly ten years, and descriptions of the Japanese cases seemed to fit the clinical picture of the Saint Louis disease.

Encephalitis is known to be caused by a filtrable virus. The disease has, as yet, not revealed its mechanism of origin and transmission and there is much still to be done by epidemiologists, just as there is still much to be learned about the immunology and treatment.

The portal of entry into the body is not certainly established, but the experimental evidence points to a probable route through the upper nasal passages directly into the brain. The lesions in the lungs and in the duodenum, though not common, have been regarded as due to migration of the virus already in the body rather than to reactions produced at the portals of entry.

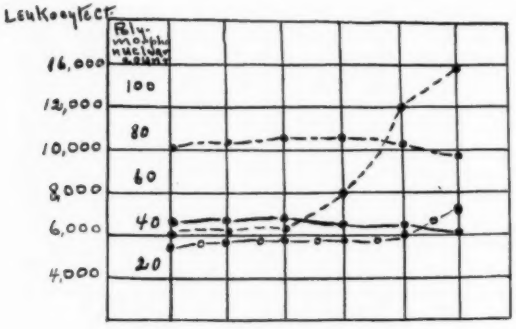
The onset was usually abrupt even though one or two days may have been required to produce prostration. The onset was characterized by pain in the front and top of the head: dull, constant, compelling and often stupefying pain; the fever was prompt in its appearance. The conjunctivae were reddened, and the neck was almost invariably stiff. After a period of twenty-four hours of severe headache, the patient soon betrayed the severity of the lesion in the brain. He settled back in dull, stuporous discomfort, awaiting the abatement of the inflammation; or, he became confused, mildly delirious and finally comatose.

The existence of abnormal responses to stimulation, such as the Babinski and kindred signs, was encountered very frequently. However, cranial nerve involvement was infrequent and interference with functions, such as swallowing, was found only in the fatal types. The average patient was well in ten days. In children the disease presented a milder display of symptoms and signs and the disease was as easily recognized in children as in adults.

LABORATORY FINDINGS

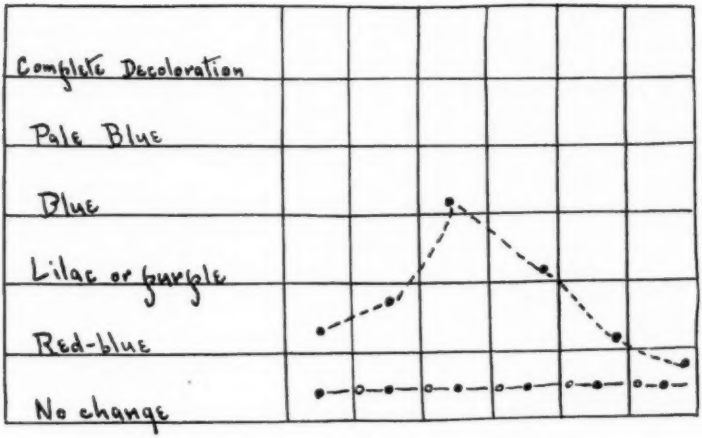
In poliomyelitis, the leukocyte count and the differential white blood count were found to be normal in all of our cases. In those cases where a slight leukocytosis did occur, it was attributed to the fact that the patient had a slight cold. The blood sugar and non-protein nitrogen determinations were normal in every case. The most valuable laboratory test in the diagnosis of poliomyelitis was the examination of the spinal fluid. If the total

white count was elevated about eight to ten cells, and the total protein above 45 mg%, the diagnosis of at least a suspicious case of poliomyelitis could be made. Although spinal fluid abnormalities are usual in poliomyelitis, one cannot rely on negative tests to rule out the diagnosis of poliomyelitis. If the patient has the abortive form or is in the first phase of the disease, the spinal fluid is expected to be negative. Even in the paralytic patients, the spinal fluid may be negative during the first week and may remain persistently normal even in fatal cases. One little girl, three years old, entered the isolation unit at the City Hospital with a perfectly normal spinal fluid and died the following morning of a bulbar poliomyelitis. An adult patient, 33 years of age, had a spinal fluid cell count of 400 with 50 neutrophiles and 50 lymphocytes. This patient left the hospital without weakness or paralysis, even though his clinical course was typically that of paralytic poliomyelitis. Even though the spinal fluid cannot be used to diagnose poliomyelitis absolutely, certain features seem to be characteristic. In paralytic cases, the cell count is highest during the first week, with polymorphonuclear leukocytes predominating. As the cell count goes down, there is an increase in the number of lymphocytes. The protein is low and often normal during the first week and becomes increasingly higher from the second to the fourth weeks.



Blood Leukocyte Count and Polymorphonuclear Count in St. Louis Encephalitis and Poliomyelitis

•—•—•Leukocyte Count St. Louis Encephalitis
– – – –Leukocyte Count Poliomyelitis
—·—·—Polymorphonuclear Count St. Louis Encephalitis
————Polymorphonuclear Count Poliomyelitis



Colloidal gold reactions in St. Louis Encephalitis and Poliomyelitis

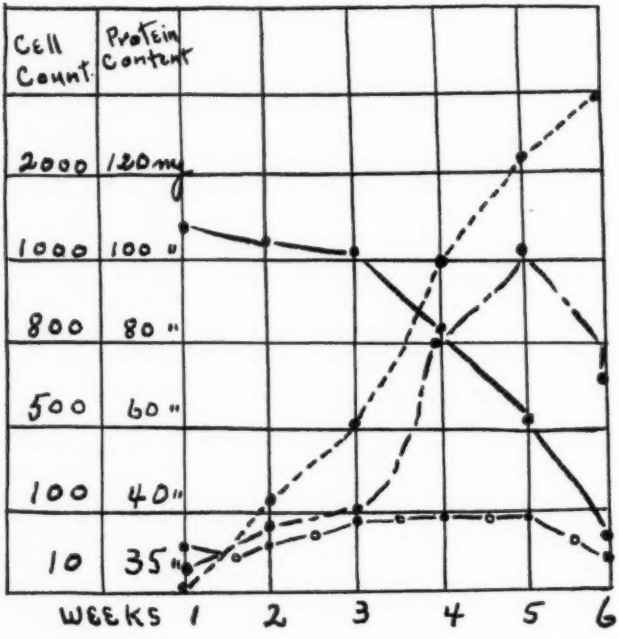
— — — — St. Louis Encephalitis
•—•—• Poliomyelitis

The colloidal gold reaction was normal in all the Saint Louis cases. The spinal fluid cell counts ranged from 10-1000 cells, with the exception of one case at the City Hospital with a spinal fluid cell count of 1800, and another case at Saint Anthony's Hospital with a spinal fluid cell count of 1500. The spinal fluid cell count of 1500 had 75% polymorphonuclear leukocytes. The patient was removed from the poliomyelitis unit and treated for acute meningitis. However, in 48 hours the patient showed definite paralysis and was again returned to the poliomyelitis unit. The spinal fluid showing the 1800 cell count formed a definite cylindrical web on standing. This patient, too, was removed from the poliomyelitis unit and treated with streptomycin for tuberculus meningitis. Within 48 hours this patient, too, was returned to the poliomyelitis unit with definite signs of weakness and paralysis.

This latter patient also had a very high fever which, it is thought, renders the capillaries in the choroid plexus more permeable and thus permits the diffusion of globulin into the spinal fluid.

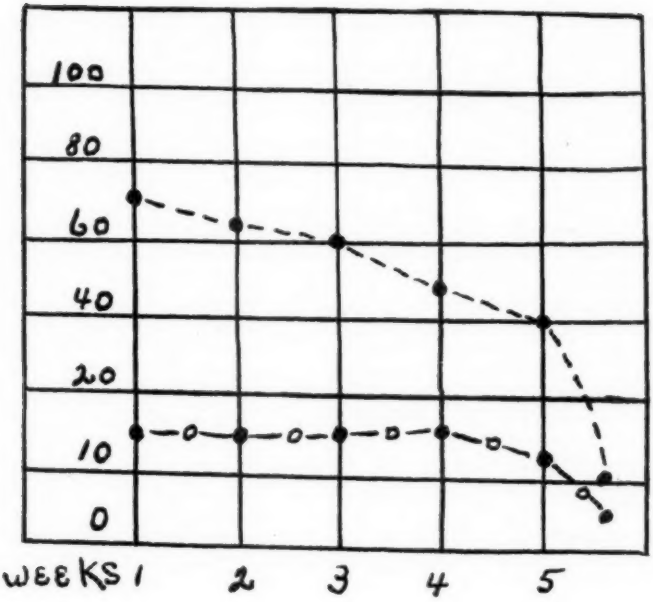
During the encephalitis epidemic, 129 cases were treated at the Firmin Desloge Hospital and we were able to secure all

necessary specimens for a complete study of the laboratory tests, and to gather a great fund of information. In the simple cases of short duration, no disturbance was noticed in the number and kind of leukocytes in the blood; but in the prolonged cases, leukocytosis was common. The commonest level was between 10,000 and 15,000 cells per cubic millimeter. Even at this level, there was no significant qualitative changes, except that the lymphocytes were somewhat higher than normal. Since so many of the patients were adults between fifty and seventy years of



Spinal Fluid Cell Count and Protein content in St. Louis Encephalitis and Poliomyelitis.

——— Protein-St. Louis Encephalitis
- - - - - Protein-Poliomyelitis
—o—o Cell Count-St. Louis Encephalitis
-—-—- Cell Count-Poliomyelitis



Polymorphonuclear Count of Spinal Fluid in St. Louis Encephalitis and Paralytic Poliomyelitis.

o — o — St. Louis Encephalitis
— — — Paralytic Poliomyelitis

age, with numerous other infirmities and disorders, the irregularity in the number of leukocytes may perhaps be taken as representing the influence of factors other than those due to encephalitis.

The other examination of diagnostic value made in the laboratory was the examination of the spinal fluid. This fluid was usually under little or no increase in pressure. Globulin was present in the spinal fluid in 70% of the cases in this series. The large majority of cases showed increases in the amounts of

sugar to levels between 60 to 100 milligrams. Nearly all fluids presented an increase in cells, the greater number showing counts between 50 to 100 cells. Ninety per cent of these cells were lymphocytes. In 91% of our cases, the colloidal gold curve closely resembled that seen in tabes dorsalis. The protein content of the spinal fluid was between 75 and 100 milligrams during the first week of the disease.

COMPARISONS

In looking over our own laboratory results in poliomyelitis and Saint Louis Encephalitis, we find the following:

1. A definite difference in the reaction of the spinal fluid of poliomyelitis and encephalitis to gold chloride solution.
2. The high white count in the spinal fluid of poliomyelitis cases during the first week of the disease as compared to the low white count in the encephalitis cases during the first week of the disease.
3. The poliomyelitis cases in the acute stage usually showed a higher polymorphonuclear leukocyte count in the spinal fluid. In encephalitis, the lymphocyte count is high.
4. In poliomyelitis, the protein content of the spinal fluid is compartively normal during the first week of the acute stage, but afterwards begins to increase and continues to increase even after the cell count begins to decrease. In encephalitis, the protein content is between 75 and 100 milligrams during the first week of the disease.

ERRORS IN CHOLESTEROL DETERMINATIONS

Submitted by
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Cholesterol is perhaps the most important sterol of the body. Its determination, if properly performed, can give valuable information in the diagnosis and prognosis of disease. The purpose of this paper is to show where errors in this determination can occur and how they can be corrected.

In general, most methods for a cholesterol determination are based on the extraction of cholesterol from blood, dissolving it in chloroform and determining it colormetrically by the addition of acetic anhydride and sulfuric acid.

According to Sister Alcuin in "Clinical Laboratory Chemistry," there are two known methods of extraction: the wet and the dry. The dry extraction is a term applied to such a technique

* To The Nebraska Society of Medical Technologists Paper Writing Contest
Read at the Annual State Meeting April 29th, 1950

as involves the drying of the specimen on porous substances such as plaster of paris or anhydrous sodium sulfate. The wet extraction is a term applied to the direct treatment of the specimen with a reagent consisting of two fat solvents.

Once cholesterol is isolated most methods depend on the Lieberman-Burchard reaction. A chloroform extract is treated with acetic anhydride and concentrated sulfuric acid. A blue to a violet color appears which changes to emerald green. Under carefully controlled conditions the green color produced is proportional to the amount of cholesterol present.

It is in the color development where most errors occur. For the sake of clarity I will present the method we use before proceeding. The following is a modification of Bloor.

Into a 25 cc volumetric flask place:
17 cc alcohol-ether mixture (3 parts alcohol to 1 part ether)
Add 1 cc of serum slowly
Dilute to graduation with alcohol-ether mixture
Let stand for 30 minutes
Filter

Into a 50 cc beaker place:
10 cc filtrate
Evaporate to dryness on a steam or water bath
Extract residue 3 times with 3 cc portions of chloroform
Filter each portion of chloroform through a plug of cotton in a 1 cc funnel directly into a 10 cc stopper graduated cylinder
Make volume of combined extract to 10 cc with chloroform
Add 2 cc cholesterol reagent
(3 cc acetic anhydride—0.3 cc H_2SO_4)
Mix by inverting
Place in the dark for 20 minutes
Transfer to absorption cell and read.

One of the first and greatest sources of error is wet apparatus. Moisture interferes with the color development giving off shades of green and sometimes causes a precipitate. Rinsing the graduated cylinder with small portions of chloroform will offset this error.

The filter paper and cotton plugs must be fat free. This is easily done by soaking the filter paper and cotton with ether and allowing them to dry. It is helpful to have these made up in advance.

If filtrates cannot be evaporated immediately the 10 cc portion should be pipetted into a beaker and then allowed to stand until time for complete evaporation. Neglecting to do this will result in a too concentrated filtrate giving false high readings.

This same error will occur if the funnel is not covered with a watch glass during the filtering process.

Scorching of the residue while evaporating the alcohol-ether filtrate will give low results. If an electric plate is used for the evaporation an annoying brownish-yellow discoloration may occur which will give off shades of green.

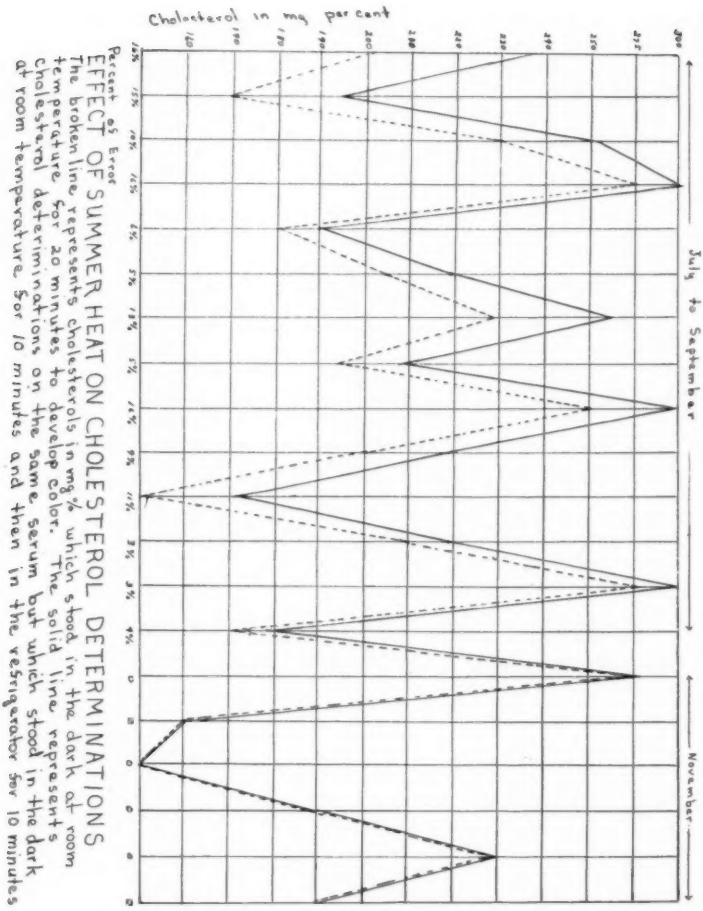
A technical error would be careless pipetting of the chloroform. If, as in the method outlined above, one would dissolve the cholesterol with approximately three cc portions of chloroform, pouring each extraction into a 10 cc glass stoppered cylinder and make the volume to 10 cc, this difficulty would be eliminated. This procedure is recommended for students since chloroform is difficult to pipette because of its low surface tension.

In order to obtain proper color development it is advisable to keep the reagents in a cool place and to allow the color development to take place in a water bath or beaker of cold water at 25°-26°. Sperry and Bloor have found this technique to be satisfactory. Sister Alcuin has accomplished the same thing by developing color for 10 minutes at room temperature and 5 minutes in the ice box.

During the summer months this type of error is quite common Last summer when I was having difficulty with cholesterol determinations, I found a note in her method about the error caused by summer heat and how to correct it. I then tried her method. All of my cholesterol determinations were done in duplicate. One sample was allowed to develop color at room temperature and the other left at room temperature for 10 minutes and 5 minutes in the ice box.

The results were revealing. During the month of July there was a 5% to a 15% error. The greatest percentage error occurred in those determinations of 180 and above. This is illustrated on the following graph. As the weather got cooler temperature ceased to be a source of error.

The method previously described recommends the mixture of acetic anhydride and sulfuric acid before adding it to the chloroform extract. The reason for this is to facilitate more accurate pipetting of the sulfuric acid. I have found that when making up very small quantities of cholesterol reagent there is a tendency to develop a yellow tinge even though the acetic anhydride and sulfuric acid were perfectly clear. If one used the yellow tinged reagent the chloroform extract could turn a cloudy green. Some authors suggest keeping the acetic anhydride cool during the process of adding the sulfuric acid. Other authors suggest adding the reagents separately to the chloroform extract. We have had excellent results using the latter.



EFFECT OF SUMMER HEAT ON CHOLESTEROL DETERMINATIONS
The broken line represents cholesterols in mg.% which stood in the dark at room temperature for 20 minutes to develop color. The solid line represents cholesterol determinations on the same serum but which stood in the dark at room temperature for 10 minutes and then in the refrigerator for 10 minutes

Because of the sensitivity of the cholesterol color to bleaching by light, photometric measurements should be made as rapidly as possible. In the method of Schoenheimer and Sperry, the color is developed in glacial acetic acid instead of chloroform giving greater stability of the color and greater accuracy in the colorimetric measurements. However, with careful technical

control of time and temperature, the reaction in chloroform also gives uniform results.

The errors for cholesterol ester determinations are essentially the same as for total cholesterols. However, the test for cholesterol esters must be done the same day the blood is obtained as the cholesterol esters are converted to free cholesterol on standing.

The errors in a cholesterol determination are the same for all methods. If difficulty occurs it is the authors wish that these suggestions will prove helpful.

BIBLIOGRAPHY

Alcuin, Sister Mary, text, *Clinical Laboratory Chemistry,* College of St. Scholastica, Duluth, 1941.

Hawk, Philip B., Oser, Bernard R., and Summerson, William H., text., *Practical Physiological Chemistry,* 12th ed., Blakiston Co., Philadelphia, 1947.

Hepler, Opal E., text, *Manual of Clinical Laboratory Method,* 4th ed., Chas. C. Thomas, Springfield, 1949.

Koch, Fredrick C., and Hawke, Martin E., text, *Practical Methods in Biochemistry,* 5th ed., Williams and Wilkins Co., Baltimore, 1948.

Kolmer, John A., and Boerner, Fred, text, *Approved Laboratory Technic,* 2nd ed., Appleton Century Co., New York, 1938.

Levinson, Samuel A., and Mac Fate, Robert P., text, *Clinical Laboratory Diagnosis,* 3rd ed., Lea and Febiger, Philadelphia, 1946.

Simmons, James S., text, *Laboratory Methods of the United States Army,* 5th ed., Lea and Febiger, Philadelphia, 1944.

Stitt, E. R., Clough, Paul W., and Branham, Sara A., text, *Practical Bacteriology, Hematology and Parasitology,* 10th ed., Blakiston Co., 1938.

MODERN METHODS FOR MAKING FECAL EXAMINATIONS FOR HELMINTHIC INFECTIONS*

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In the past few years there have been devised no strikingly new methods of diagnosis of worm infections, but a number of modifications of old methods have been suggested which in the opinion of their authors, at least, tend to improve them, either in accuracy or in simplicity.

Before discussing these modifications I shall briefly review the principal methods employed in the diagnosis of intestinal helminthic infections, to a consideration of which the present paper will be confined.

The majority of intestinal helminthic infections can be diagnosed by finding the eggs or larvae in the feces either by means of a simple smear or by various concentration methods. The most notable exception is the pinworm, *Enterobius vermicularis,* which deposits its eggs on the perianal skin, and the larger tapeworms, *Taenia saginata* and *T. solium,* and more rarely other tapeworms such as Dipylidium,

* Read before ASMT Convention, June, 1950, Houston, Texas.

Mesocestoides, or Raillietina, which do not always spill the eggs from the shed segments before these pass the anal sphincter, and therefore are best diagnosed by finding the living, moving proglottids in the freshly passed feces. They are not ordinarily buried in the fecal mass, but will be found squirming actively on the surface. Often Taenia eggs are squeezed out during passage, and are not infrequently found on perianal skin even when not discovered in the feces.

For simple diagnosis of most of the commoner helminthic infections—hookworm, ascaris, trichuris and Hymenolepis infections, a simple smear, properly made and examined, will usually suffice for the diagnosis of all but very light infections. If made either too thick or too thin, of course, the efficiency is reduced, and since only a very small amount of feces is being examined, it is important that the entire preparation be scanned and that eggs are visible and identifiable if present. A useful adjunct to the usual simple smear is the preparation of a *dried* smear covered with cedar oil or liquid paraffin, in which the uncleared eggs stand out rather sharply. It is especially useful for the identification of unfertilized ascaris eggs. It is also useful for fertilized ascaris, Trichuris, small fluke eggs, Taenia, and Hymenolepis eggs, but not for hookworm or Dibothriocephalus, which become transparent, or for large fluke eggs such as those of Fasciola, Fasciolopsis or schistosomes, which become shrunken and unrecognizable.

Beaver (1949a) has recently developed a method whereby a simple smear can be used for quantitative determination of hookworm eggs. The eggs of hookworms have been shown to be distributed in feces uniformly enough so that the small sample employed in the smear is adequate if there are from 300 to 500 eggs per gram formed stools, this representing roughly 10 mature hookworms *(Necator americanus)*. Hitherto dilution methods have been used, and rough corrections made for consistency of the stool, i.e., whether formed, mushy or liquid. Beaver, by means of a simple homemade apparatus, found that direct fecal smears containing about 1/300 gm. of feces could be standardized by using a light meter to measure its turbidity. A drop of an especially prepared suspension of barium sulfate described by Beaver (1949b) can be used as a standard; the feces is added to a drop of water until a suspension of similar density is obtained. The drop is then covered by a 22 x 22 coverslip and all the eggs counted. Each egg counted represents 300 eggs per gram and as remarked above, indicates roughly a worm burden of about 10 mature hookworms.

The most widely used salt flotation concentration method at the present time is Faust's zinc sulfate method, since the zinc sulfate solution permits identification of protozoan cysts as well as helminth ova, whereas saturated sodium chloride shrinks the cysts beyond recognition. Various efforts have been made to sim-

plify the Faust technique, and with some success. Bijlmer (1948) compared a number of techniques, and found a simplified zinc sulfate method which he describes as accurate as the original Faust method for various helminthic infections. He suspends a fleck of feces about the size of a pea in a mortar with 33% $ZnSO_4$, and filters this through cheesecloth if much detritus floats, but in most instances this is unnecessary. The comminuted feces is decanted to a centrifuge tube and enough 33% $ZnSO_4$ added to fill the tube to within a half centimeter of the top, centrifuged for 2 minutes at 1000 r.p.m., and the surface film lifted off with a 4 mm. loop.

Although Strongyloides larvae float and are recognizable, better results with these are obtained by suspending a portion of the feces in gauze in a conical glass container filled with water at 40° C, a modification of the Baermann apparatus. The larvae migrate into the warm water, and soon settle to the conical point of the vessel. Another useful method for Strongyloides is culturing the stool by mixing a portion of the feces with an equal amount of animal charcoal, spreading on a folded moist filter paper in a petri dish and leaving at room temperature for from 2 to 4 days. The larvae will be found largely concentrated in the water of condensation on the glass cover. Others can be extracted from the culture by means of a Baermann funnel.

A technique which the writer has found very useful as a substitute for the $ZnSO_4$ flotation method is the A.E.X. (acid, ether, xylene) method described by Loughlin and Stoll (1946), the advantage being that it concentrates eggs of schistosomes and other flukes, and also Taenia eggs, as well as those that float in strong salt solutions. It is a modification of the old Telemann HCl-ether method. Four cc of feces is comminuted with 56 cc of water; of this 1.5 cc is added to 3.5 cc of 20% HCl (20 cc conc HCl diluted to 100 cc with distilled water), rubber stoppered, shaken for 1 minute, and let stand for 2 minutes. Then 5 cc of a freshly prepared mixture of equal parts xylene and ether are added; this is shaken and then centrifuged at 1800 to 2000 r.p.m. for 2 minutes. The majority of the fecal material forms a coagulum at the junction of the acid and ether-xylene components of the tube; this can be freed from the walls by means of an applicator stick, and decanted with the fluid in the tube, leaving the small amount of sediment, containing the eggs, in the bottom of the tube. A drop of 0.1N NaOH is added to the sediment, mixed with a capillary pipette, and the whole transferred to a slide for counting. The method was shown to be better than the DCF flotation method for eggs that float, with the added advantage of concentrating the non-floating eggs, such as those of schistosomes and other flukes. It also has the advantage of using an originally large sample of feces (4 cc) thus overcoming the effect

of unequal distribution of such eggs as those of schistosomes.

For diagnosis of Enterobius infections it has long been recognized that examination of feces is unreliable, and various methods of examining material from the perianal skin have been devised. These are mainly of three types—the NIH or cellophane swab devised by Hall (1937), the wet pestle devised by Schüffner and Swellengrebel (1943), and the scotch tape method devised by Jacobs (1942). These methods have recently been studied and compared by Beaver (1949c).

The NIH method consists of a piece of cellophane the size of a coverglass wrapped around the end of a glass rod and held on by a narrow piece of rubber tubing. The rod is passed through a rubber stopper into a vial, which makes a convenient container for transportation to a laboratory where the cellophane square is spread over a drop of water or N/1 NaOH on a slide and examined. The wet pestle is a piece of glass rod mushroom shaped at the end and ground to a rough surface. A drop of water is placed on a slide, the head of the pestle wetted in it, and the anal skin folds then gently massaged; the material thus obtained is transferred to the slide, and this procedure repeated several times. The slide can be examined at once or dried for subsequent examination, when application of immersion oil clears everything but the eggs.

The scotch tape method consists of applying the sticky side of a piece of scotch tape, 3″ by ¾″, to the anal folds by means of a wooden tongue blade. The tape can then be smoothed back on a slide, sticky side down, and examined at once, or the tape can be folded together, adhesive side in, with a piece of folded paper as a label between the two ends. The folded tape can subsequently be opened, laid on a drop of toluene on a slide and examined. The toluene dissolves the sticky material and clears everything but the eggs.

Beaver found the NIH swab inferior to the other methods, and the scotch tape method superior to the pestle. The latter was found to be less efficient if few eggs were present, as after a patient has been bathed for a visit to a doctor's office. The pestle is satisfactory when the patient, microscope, pestle, water and a microscopist are all together, but the scotch tape is more amenable to use by parents or other untrained individuals, for subsequent examination in a laboratory.

To summarize, I believe that the best all-around method of diagnosis for all intestinal helminthic infections except Strongyloides, Enterobius, and Taenia infections, and of course Trichinella, is examination of the feces by the A.E.X. method of Loughlin and Stoll. For Strongyloides, suspending a portion of the feces in a piece of gauze in the top of a conical container filled with warm water, or culturing, is advisable in chronic cases, although often the larvae

will be found without trouble in simple smears or after $ZnSO_4$ floatation. For Enterobius, the scotch tape method is recommended. For the larger tapeworms, except Dibothriocephalus, which can be diagnosed by A.E.X.—i.e., Taenia and the rarer tapeworms such as Dipylidium, Mesocestoides, and Raillietina—examination of the freshly passed feces for active shed proglottids, or in the case of the Taenias examination of the perianal skin by the scotch tape method, are more likely to yield results than examination of feces for eggs.

REFERENCES

Beaver, Paul C. 1949a. Quantitative hookworm diagnosis by direct smear. J. Parasit. **35**:125-135.

————. 1949b. A nephelometric method of calibrating the photoelectric light meter for making egg counts by direct fecal smear. J. Parasit. **35**(6) Sect. 2: 13.

————. 1949c. Methods of pinworm diagnosis. Am. J. Trop. Med.. **29**:577-587.

Bijlmer, J. 1948. On the recovery of Protozoa and eggs of some species of helminths in human feces. J. Parasit. **34**(2):101-107.

Hall, M. C. 1937. Studies on oxyuriasis. I. Types of anal swabs and scrapers, with a description of an improved type of swab. Am. J. Trop. Med. **17**:445-453.

Jacobs, A. 1942. Enterobiasis in children. Incidence, symptomatology and diagnosis with a simplified scotch cellulose tape technic. J. Pediatrics **21**:497-503.

Loughlin, E. H., and Stoll, N. R. 1946. An efficient concentration method (AEX) for detecting helminthic ova in feces (modification of the Telemann technique). Am. J. Trop. Med. **26**(4):517-527.

Schüffner, W., and Swellengrebel. ü N. H. 1943. Eine Zweizeitige Methode zum Nachweis von Oxzuris-eiern Ihre Leistung gegenüber dem americanischen NIH Wischer. Zentr. f. Bakt. Abt. Orig. **151**:71-80.

THE DETECTION OF RH ANTIBODIES BY THE TRYPSINATED ERYTHOCYTE TECHNIC

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The work on Rh antibodies has been complicated by the existence of several types of antibodies, each requiring a special technic for its detection. There has been and still is a need for a single rapid simple test for Rh sensitization. Tests, using trypsin either as a one per cent solution or as trypsinated erythrocytes, have shown promise of meeting this need. The addition of trypsin to erythrocytes has been found to change the composition of the cells, presumably the receptors, so that they are agglutinable by sera containing Rh antibodies whether saline or albumin. This paper presents the results of using trypsinated erythrocytes for the detection of Rh antibodies as compared with the standard tests for Rh antibodies in saline and in al-

bumin and with the indirect Coombs test.[1] All tests were done on the same serum sample.

Pickles[2] showed in 1946 that cholera filtrate when added to erythrocytes and "incomplete" anti-D sera from which the "T" agglutinin was removed caused agglutination of Rh positive cells and not Rh negative cells. The cholera filtrate was believed to act on some locus of the erythrocytes so as to allow the "incomplete" or albumin antibody to react with the red cells.

Pickles and Morton[3] in 1947 showed that the addition of a solution of crystalline trypsin caused agglutination of cells sensitized with "incomplete" anti-D antibody and also enhanced the specific agglutination of other hemagglutinins in the absence of any detectable antibody of the "incomplete" type. They showed that when trypsin is added directly to the serum, the agglutinating action may be inhibited by the natural trypsin inhibitor present in all sera. This inhibition could be overcome by adding an excess of the enzyme or by removal of serum inhibitor or by washing the cells already sensitized before exposing them to the trypsin.

Kellner and Haber[4] in 1949 modified the above test by adding a solution of commercial trypsin to known group O Rh positive (CDE) cells and incubating them for ten minutes at 37° C. They found that these cells were agglutinated by sera containing Rh antibodies whether of the saline or albumin order. Further, they found that the test is sensitive to cold agglutinins and gives false positive results with sera containing them. It also reacts to the autoagglutinins found in hemolytic anemias.

Method

The trypsin used for the tests performed in this paper was the crude trypsin by Difco. It was prepared as a one per cent solution in 0.85 per cent sodium chloride solution, hereafter referred to as isotonic saline, and filtered through a Seitz filter under sterile conditions. This solution was found to be satisfactory for approximately one month if kept refrigerated and was used for the preparation of the trypsinated cells. Fresh group O Rh positive (CDE) cells washed once with isotonic saline are made to a five per cent suspension in isotonic saline. To every one cc. of this five per cent cell suspension is added 0.1 cc. of the stock one per cent trypsin solution. This is incubated at 37° C. for ten minutes, washed three times in isotonic saline and resuspended in isotonic saline. Instead of the five per cent final cell suspension used by Kellner and Haber we have used an approximately one per cent cell suspension in an attempt to standardize and correlate as closely as possible the antibody tests used in this experiment.

The trypsin test for sensitization was performed by pipetting 0.1 cc. of the one per cent trypsinated cell suspension described above and 0.1 cc. of the serum to be tested into a test tube and centrifuging for one minute. All tests showing any degree of agglutination were diluted with isotonic saline, re-centrifuged and re-read for agglutination in an attempt to eliminate false positive readings due to rouleaux. The trypsinated cells were made up fresh every day and used within a few hours, since it was found that trypsinated cell suspensions show definite decrease in sensitivity upon standing 24 hours.

The antibody test for sensitization in saline was performed by pipetting 0.1 cc. of serum to be tested and 0.1 cc. of one per cent solution of group O Rh positive (CDE) cells in saline (not trypsinated) into a test tube, incubating for one hour at 37° C., centrifuging for one minute and reading for agglutination. The antibody test for sensitization in albumin was performed by pipetting 0.1 cc. of serum to be tested and 0.1 cc. of one per cent solution of group O Rh positive (CDE) cells in 20 per cent bovine albumin into a test tube, incubating for one hour at 37° C., centrifuging for one minute and reading for agglutination.

The indirect Coombs[1] test for the detection of isoimmunization was done on most of the sera showing marked discrepancies between the different tests. One-tenth cc. of the serum to be tested and 0.1 cc. of one per cent group O Rh positive (CDE) cells in isotonic saline were pipetted into a test tube and incubated at 37° C. for one hour. These were centrifuged and read for agglutination. If none was present, the cells were then washed four times in isotonic saline. After the fourth washing, the saline was decanted, two drops of anti-human globulin serum were added, and the whole was reincubated for one hour. The tests were then centrifuged and read microscopically.

The direct Coombs[1] test and Witebsky's[5] twelve drop test for sensitization were done on all cord bloods. In the direct Coombs test, the cord blood cells were washed four times with saline, the saline was decanted and two drops of anti-human globulin serum were added. The test was then incubated for one hour at 37° C., centrifuged and read microscopically.

Witebsky's twelve drop test is based on the principle that sensitized cells from cord blood are agglutinated by normal human adult serum or by a 50 per cent mixture of this serum and bovine albumin. Group AB serum is used. The test is set up with an elaborate system of controls and has proven quite sensitive in our hands.

The group O Rh positive (CDE) cells used in all tests were standard cells collected weekly in ACD solution from the same donor. Since this donor also possesses the factor c he is assumed to possess the Rh negative blood factors (cde). The use of the

same donor for the tests in this experiment eliminated variations which might be due to different test cells.

The type of Rh factors were determined on most of these bloods before they were used in this experiment. The Rh determinations using the Chown technique were done by dipping the capillary tube into the anti-Rh serum and then into the serum-suspended cells in the pilot tube. We did not realize for some time that this procedure led to the introduction of sufficient amounts of anti-Rh serum of a high titer to give a positive test for Rh antibodies, usually for those of the albumin series. Hence, we obtained many false positives for sensitization among the donor bloods studied. This was true of some of the bloods from the rh negative patients, but approximately 300 of these were not subject to the complication of accidentally added antibodies. The available cord bloods were tested by the direct Coombs technique and Witebsky's twelve drop method in order to help evaluate the accuracy of the results obtained on these mothers.

RESULTS

Of the 614 *rh negative blood donors,* 345 were negative to the trypsinated cell test and to the antibody tests in saline and in albumin; the remaining 269 gave some kind of a positive reaction.

Table 1 shows that of these, 50 gave a positive reaction to the trypsin test only, 127 were positive to the albumin test only, 80 were positive to both the trypsin and the albumin test, 3 were positive to albumin and saline, 2 were positive to trypsin and saline, and 7 were positive to all three tests. One hundred seventy-seven of these samples which gave one or more positive tests as outlined above were further studied by the indirect Coombs technique, and approximately 40 per cent of these gave a positive Coombs test.

TABLE 1

Comparative Results of RH Antibody Tests on RH Negative Donors

Sensitization Test	Number of Positive Tests	INDIRECT COOMBS	
		Positive	Negative
Trypsin only	50	16	19
Albumin only	127	29	51
Trypsin and albumin	80	36	34
Albumin and saline	3	1	..
Trypsin and saline	2	1	..
Saline only	..	..	..
Trypsin, saline and albumin	7	..	..
No. of samples with positive tests	269	83	104

Of the 499 rh negative obstetrical patients, 251 were negative to all three tests for sensitization; the remaining 248 gave some positive test. Table 2 shows that of these, 77 were positive to the trypsin test only; 54 were positive to the albumin test only, 63 were positive to both the trypsin and albumin tests, one was positive to saline only, and 48 were positive to all three tests.

One hundred fifty-four of these samples which gave one or more positive tests were studied further by the indirect Coombs technique, and approximately 44 per cent of the samples so studied gave a positive Coombs reaction.

These results indicate a relatively high percentage of positive tests for sensitization, especially among the rh negative obstetrical patients. Further, our results also show little correlation between the various antibody tests studied.

Sera on which the trypsin test was positive and the albumin test negative were found in 127 cases. In 84 of these the presence of autoagglutinins was investigated and was found to be positive in approximately forty per cent of these cases.

Serial dilutions on nine sera which gave positive reactions to trypsinated cells and to the albumin test were done. In every case the reaction of the trypsinated cells in the increasing serum dilution in saline was markedly less than the reaction in the corresponding albumin titration. This indicates that the factor which gives a positive reaction to trypsinated cells is not sufficiently concentrated to withstand saline dilution.

TABLE 2

Comparative Results of RH Antibody Tests on RH Negative Obstetrical Patients

Sensitization Test	Number of Positive Tests	INDIRECT COOMBS	
		Positive	Negative
Trypsin only	77	17	41
Albumin only	54	14	19
Trypsin and albumin	63	26	19
Albumin and saline	5	1	2
Trypsin and saline	..	..	..
Saline only	1	1	..
Trypsin, saline and albumin	48	8	6
No. of samples with positive tests	248	67	87

The results as a whole outlined in Tables 1 and 2 show little correlation between the trypsin test and the saline test for Rh antibodies or between the trypsin test and the albumin test for Rh antibodies This is true whether we are investigating the blood of rh negative donors or rh negative pregnant women. Moreover, there seems to be little correlation between the positive results obtained with trypsin and the number of positive Coombs tests found on these same samples. For that matter, positive results with any of the three tests were not necessarily confirmed by the Coombs test.

In view of our discrepant results, it was felt that the trypsin test was giving positive results of a non-specific nature to cells irrespective of their Rh status. Accordingly, 93 sera which gave a positive trypsin test and a negative albumin test were tested against trypsinated group O rh *negative* cells. Seventy-seven of these 93 gave a positive reaction to the trypsinated rh negative cells. While it is

TABLE 3

Results of Direct Coombs Test and the Witebsky Twelve Drop Test on Babies Compared with the Results of the Mother's Antibody Tests

Mother	Baby's Group	Direct Coombs	Witebsky Test	TESTS ON MOTHER BEFORE DELIVERY			
				Trypsin	Saline	Albumin	Indirect Coombs
H. W.	A Rh pos.	+	+	neg.	neg.	1:1	.....
M. M.	A Rh pos.	neg.	neg.	neg.	neg.	1:16	.....
M. J.	O Rh neg.	neg.	neg.	++	1:16	1:256	.....
J. H.	A Rh pos.	neg.	neg.	neg.	neg.	1:4	.....
M. D.	O Rh pos.	neg.	neg.	++++	neg.	neg.	+
M. C.	O Rh pos.	pos.	neg.	++++	neg.	neg.	neg.
D. K.	A Rh pos.	neg.	neg.	+	neg.	neg.	+
I. A.	O Rh pos.	neg.	++	++++	neg.	1:1	neg.
M. P.	B Rh neg.	neg.	neg.	++	neg.	1:4	++++
R. F.	A Rh pos.	neg.	neg.	+	neg.	neg.	neg.
M. H.	A Rh pos.	pos.	pos.	++++	1:8	1:256	.....
D. C.	O Rh pos.	neg.	neg.	++	neg.	neg.	neg.
B. H.	A Rh neg.	neg.	neg.	++	neg.	1:4	+
R. D.	AB Rh pos.	neg.	neg.	neg.	neg.	1:1	neg.
E. F.	AB Rh neg.	neg.	neg.	++++	neg.	neg.	++
R. R.	O Rh pos.	neg.	neg.	++	1:1	1:32	++
V. C.	B Rh pos.	neg.	neg.	++++	1:4	1:64	neg.
L. C.	O Rh pos.	neg.	neg.	++++	neg.	1:2	neg.
M. J.	A Rh pos.	neg.	neg.	++++	neg.	+++	++
G. L.	AB Rh pos.	neg.	neg.	++	neg.	+++	+
M. B.	.....	.....	.....	++++	1:64	1:1024	.....
Ten cases	.....	neg.	neg.	neg.	neg.	neg.	neg.

conceivable that sensitization to some of the rh negative factors may have occurred in some of these cases, it is unlikely that this was a factor of any significance, and the results indicate a high number of non-specific reactions to trypsinated cells, regardless of their Rh status.

Cord bloods from mothers tested in this series have been examined in 31 cases by the direct Coombs technique and the Witebsky twelve drop test and the comparative results are shown in Table 3. Most striking is the lack of correlation between our results on the mother before delivery and the results on the Coombs test on the cord blood. Moreover, the general discrepancies between the trypsin test and the other tests for Rh senitization are well illustrated in this table.

SUMMARY

Comparative studies on the use of trypsinated Rh positive (CDE) cells for use as an antibody test have been presented. It appears that many discrepancies exist between this test and the recognized tests for Rh antibodies. Further comparative work is in progress.

REFERENCES

1. Coombs, R. R. A., Mourant, A. E., and Race, R. R.: Brit. J. Exper. Path. 26:255-266, 1945.
2. Pickles, M. M.: Nature 158:880, 1946.
3. Morton, J. A., and Pickles, M. M.: Nature 159:779, 1947.
4. Kellner, A., and Haber, J. M.: Paper presented before the Second Annual Meeting of the American Association of Blood Banks, Seattle, Washington, Nov. 3-5, 1949.
5. Witebsky, E.: Personal communication.

A SUGGESTED METHOD FOR THE DETECTION OF THE DIABETIC AND PRE-DIABETIC*

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Diabetes mellitus is defined as an hereditary disease which is characterized by an elevation of the blood glucose and the excretion of this sugar in the urine. It is dependent upon the failure of the isles of Langerhans of the pancreas to produce insulin or upon the inefficient action of the insulin produced.[1] The causative factor of the above is complex.

The modern trend in the diabetic field, as in many other fields of medicine especially that of tuberculosis, is early diagnosis and prevention of diabetes rather than diagnosis and treatment of advanced or developed diabetes mellitus alone. The need for an early diagnosis of diabetes is obvious if one but reviews the development of the disease. "The sugar content of the blood increases progressively with the onset of diabetes, and when this increase reaches a certain level which we call the "renal threshold," the sugar passes into the urine. Diabetes can have a sudden onset but usually the disease develops gradually over a period of months or even years and during this stage of development none of its classical symptoms are present. When symptoms exist, the diabetes is invariably severe, although not necessarily permanently so. In its incipiency diabetes may be regarded as a functional disease and, by correcting the hyperglycemia, there is a good hope that the islet cells may regenerate or recover their function completely."[2] According to Gusman the early detected diabetes is far more amendable to treatment.[3] If one will read Joslin's Diabetic Creed, the importance of early discovery of the disease is stressed most emphatically. Joslin has emphasized that we can avoid some of the worst complications of diabetes by early diagnosis and that "the only way in which an early diagnosis of diabetes will ever be made is to search for it." He also stated that "an early diagnosis in diabetes is as important as in tuberculosis."[1]

We are all familiar with the recent progress which has been made in the early diagnosis and prevention of the disastrous complications of tuberculosis. This has been accomplished through frequent periodic examinations accompanied by chest x-rays, or by mass chest X-rays alone. How can such a program be launched in connection with diabetes? Several mass surveys have previously been reported by (1) Edwin W. Gates, M.D.,[4] (2) H. L. C. Wilkerson & L. P. Krall,[5] (3) J. A. Keeperg & R. D. Lawrence,[6] and H. Blotner.[7]

In each of the above reports the screening method used was

* Read before ASMT Convention, Houston, June, 1950.

either urine sugar determinations or blood glucose determinations alone or a combination of the two which were taken at random or following a meal. Are either of these methods sufficient for the detection of the early or pre-diabetic—the patient with diabetic tendencies but who is still in the onset stage of the disease at which time the blood glucose level has not risen sufficiently to allow glucose to be passed into the urine? It is with this question in mind that I present to you a survey of 500 individuals.

Routine periodic examinations were given patients after which each was placed on a 2550 calorie diet (carbohydrate, 300 grams; protein, 90 grams; fat 110 grams; division 1/3, 1/3, 1/3) for one week. At the end of this time patients were instructed to drink prepared solution containing 50 grams of glucose at 7 am., to eat the breakfast listed on the diet, and to report to the laboratory at 8 a.m. Routine urine sugar determinations were performed using the standard Benedict's urine test. Blood glucose determinations were also done using the standard Folin-Wu test. The results were as follows:

47 with blood determinations above 150 mgm. % with or without glycosuria.

63 with glycosuria with or without blood glucose determinations above 150 mgm. %

The screening level of the blood sugar determinations was arbitrarily set at 150 mgm. %. Follow up 1 dose (1.75 grams glucose per kilogram of body weight), 3 hour glucose tolerance tests were performed on a total of 47 patients who showed blood glucose results above the screening level with or without glycosuria. For one week prior to glucose tolerance determinations, patients were placed on the same 2550 calorie diet mentioned above and were instructed to fast from 7 p.m. on the evening prior to the test. Results of these tolerance tests were as follows:

30 normal glucose tolerance curves
17 abnormal glucose tolerance curves of which
10 were classified as diabetics and
7 were classified as pre-diabetics or potential diabetics.

As seen in Table No. 1 only two of those showing an abnormal glucose tolerance curve had previous indications of sugar in the urine and only six showed an abnormal fasting blood sugar level (above 130 mgm. %). In other words if former methods had been employed only six diabetics would have been detected compared with 17 found in this survey.

From these results it is our belief that the use of urine sugar determinations or fasting blood sugar determinations, alone or together, as a criterion for the detection of the prediabetic or diabetic is not sufficient but that the following regime, or one similar to it, should be held to:

TABLE I

No.	No. Times Examined	Age	Sex	BL. Sugar Screening		GLUCOSE TOLERANCE CURVE					No. Negative Urine Sugars	Classification and Miscellaneous Information
				BS mgm%	US	Fast.	1	2	3	Hours		
8	8	43	F	165	N	122	232	173	93	mgm% BS	2	Potential diabetic
						N	Tr.	S. Tr.	N	US		
10	7	65	M	254	3+	118	275	225	182	mgm% BS	9	Diabetic
						N	2+	3+	2+	US		Angina pectoris
41	2	46	M	200	2+	140	280	190	155	mgm% BS	3	Diabetic
						N	3+	4+	2+	US		Overweight
57	2	35	M	160	vst	100	220	164	89	mgm% BS	1	Potential diabetic
						N	2+	1+	N	US		
68	6	45	M	162	N	113	195	148	132	mgm% BS	6	Diabetic
						N	N	N	N	US		
73	9	50	M	246	vst	136	212	120	119	mgm% BS	11	Potential diabetic
						N	vst	N	N	US		Overweight, hypertension
114	7	48	M	205	tr	128	263	272	216	mgm% BS	7	Diabetic
						N	2+	4+	4+	US		Overweight
119	3	41	M	235	4+	186	276	.....	227	mgm% BS	8	Diabetic
						N	2+	.....	4+	US		1 ft. trace urine sugar 7 years previous
178	4	40	M	237	4+	103	212	205	163	mgm% BS	3	Diabetic
						N	1+	4+	1+	US		Overweight
251	3	51	M	212	3+	112	220	146	69	mgm% BS	4	Potential diabetic
						N	4+	3+	N	US		
255	3	46	M	194	2+	117	195	216	180	mgm% BS	4	Diabetic
						N	N	4+	4+	US		Cirrhosis
343	3	33	M	154	N	105	222	155	124	mgm% BS	4	Potential diabetic
						N	1+	H.tr.	N	US		
386	3	41	F	190	N	130	190	193	133	mgm% BS	3	Potential diabetic
						N	H.tr.	tr.	N	US		
409	3	55	M	163	3+	140	240	270	198	mgm% BS	2	Diabetic—4+ urine sugar 6 years previous
						N	H.tr.	4+	3+	US		
418	5	49	M	177	2+	153	184	240	370	mgm% BS	3	Diabetic
						N	tr.	H.tr.	1+	US		
441	7	60	M	168	1	113	222	224	147	mgm% BS	5	Diabetic
						N	1+	2+	3+	US		Hypertension
476	2	48	M	187	N	137	202	132	131	mgm% BS	2	Potential diabetic
						N	N	N	N	US		

Diabetics..... 10
Potential diabetics..... 7

Total..... 17

1. Diet supervision for at least one week prior to the screening test.
2. Screening test should consist of blood and urine glucose determinations taken one hour post breakfast and the ingestion of 50 grams of glucose.
3. Screening blood glucose level should be 150 mgm. % with or without glycosuria.
4. Follow up 1 dose, 3 hour glucose tolerance tests, preceeded by diet supervision, should be done on all patients who show blood glucose results above screening level.

I wish to give my sincere thanks to H. T. Engelhardt, M. D. for his aid in making this paper possible. This survey will continue during the following year.

REFERENCES

1. Joslin, E. P., Root, H. F., White, P., Marble, A., and Bailey, C. C.; The Treatment of Diabetes Mellitus, 8th ed., Philadelphia; Lee and Feberger, 1947.
2. Watson, W. M. The Aetiology and Diagnosis of Diabetes Mellitus, Univ. of Western Ontario Med. Jr., 17: 57-69, Mr. '47.
3. Gusman, H. A. Modern Aspects of Diabetes Mellitus, Ohio State Med. Jr., 43: 1145-47, Nov. 1947.
4. Gates, Edwin W. A Study of a Group of 1,800 Individuals of the E. I. du Pont de Nemours & Co., Industrial Med., Aug. 1942.
5. Wilkerson, H. L. C. and Krall, L. P., Diabetes Mellitus in New England Town; Study of 3,516 Persons in Oxford, Mass., J. A. M. A., Sept. 1947, 135: 209-216.
6. Keeperg, J. A., and Lawrence, R. D., Incidence and Classification of Glycosuria in Recruits, Lancet, June, 1947.
7. Blotner, H., Studies in Glycosuria and Diabetes Mellitus in Selectees, J. A. M. A., 131: 1109-1114, 1946.

WORKSHOP PROBLEMS OF EDUCATION OF MEDICAL TECHNOLOGISTS* HOW SHALL WE KEEP THEM EDUCATED?

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There is no question of the need for continued education for medical technologists after registration. The rapid advances which are being made in every field of medicine, today, render this continued education necessary. The point at issue, therefore, is not "Shall we?" but, "How shall we?"

To many technologists, this means one of two procedures: 1. refresher courses given sporadically, and 2. further courses in science for medical technologists without degrees, and advanced courses in science in graduate schools for those possessing degrees. These are good in themselves, but they do not insure a satisfactory answer to the question, "How Shall We Keep Them

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Educated?" As educators, we can encourage but we cannot force.

However, there are two very important means by which our efforts *will keep them educated.* The first of these is proper education in their student days. The greatest help that leaders in education can give to the students is to teach them to help themselves. This applies both to the pre-requisites and to the actual medical technology program.

Concerning pre-requisites, the small booklet published by the Registry of Medical Technologists, January 1, 1950 has a number of excellent subjects listed as pre-requisites, but most of them are joined by the conjunction "or." The proper conjunction should be "and." It is impossible to understand how an applicant could be expected to understand the principles involved in the various chemical procedures and to pass the examination without a knowledge of quantitative analysis *and* organic chemistry in addition to the general chemistry that is required. The same holds for various subjects listed under biology and for physics.

Concerning education in the field of medical technology itself, a thorough study of the principles involved in all procedure encountered should be included with a sufficient number of didactic hours as well as laboratory hours. In addition, and this is very important to the students, there should be a formal course in Seminar. Where this is impractical, the various subjects in medical technology should be conducted in such a way as to include the principles of seminar. This would familiarize the students with journals helpful to them in the future. If properly conducted, this method would help them to evaluate various articles and would teach them to give any new procedure the proper trial period without adopting it immediately. Thus the students would be prepared to meet the future and to help keep themselves educated.

Equally as important as number 1, or "proper education," is number 2, or "affiliation with the District, State, and American Societies of Medical Technologists." Students should be taught the value of these Societies and should be encouraged to join the District and the State Societies while they are still students or even be required to join the District Society. District and State Societies offer monthly and semi-annual meetings of an educational nature. It is easy for these organizations to arrange for periodic seminars and refresher courses which will be conveniently arranged for the members, and of which all members will be notified. Grants from the Registry of Medical Technologists are available to help defray expenses of such educational programs provided they are not a part of the annual or semi-annual State meetings.

When Dr. Andujar assigned me this particular part of the program, he listed a number of questions he thought might help me formulate my material. The answers to these questions have been

included with one exception in the material already given. It can be answered, only by asking the question outright and then answering it. "What about the present Registry requirements for renewal of certification after lapses? Should registrants be re-examined every three or every five years?" If the education of the medical technologist is adequate, I do not think the registrant should be re-examined after being once registered. I suggest the following plan. If, as is the case of many women, registered medical technologists are no longer active, they should request in writing that they be put on the inactive list. If they wish to continue receiving the *Technical Bulletin*, they shall continue paying their registration fee and shall receive annually the certificate of Inactive Registered Medical Technologist. If they do not wish to be on the mailing list, they shall receive an inactive certificate, effective for as long as the medical technologists are inactive. No fee shall be charged. If in the future, circumstances should require inactive members to work again, after working for a period of six months as medical technologists, they shall be re-instated as active registered medical technologists and shall pay annual fees. If a registered medical technologist should let his registration lapse without notifying the Registry Office and without asking to be placed on the inactive list, then in addition to the six months brush-up period, he should pay a fine of $10.00 or the sum of his back fees if these amount to less than that amount.

A MORE RAPID METHOD FOR DETERMINING HETEROPHILE ANTIBODY AGGLUTINATION

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The standard heterophile antibody agglutination determination consists of the patient's inactivated serum, saline and washed sheep cells in serial dilutions of from 1:7 through 1:3584. The tubes are examined for agglutination of the cells after remaining at room temperature for two hours. Some text books suggest the final reading only after two hours or overnight refrigeration of the tubes in addition to the two hours at room temperature.

A time-saving slide test was brought to my attention.[1] One drop of the patient's inactivated serum when mixed with one loopful of concentrated washed sheep cells would show immediate clumping of the sheep cells if positive for heterophile antibodies. Only when clumping appeared on the slide was it necessary to follow with the serial dilution test tube method.

The slide test was found to be extremely sensitive. Heavy and

[1] "Rapid Macroscopic test for Infectious Mononucleosis," Am. J. Clin. Path. 19:665-667, 1949.

immediate clumping was visible even when by dilution method a 1:7 dilution showed no agglutination. We then dropped varying dilutions of inactivated serum on slides and mixed each with a loopful of concentrated washed sheep cells. As a screening test this was a failure. Regardless of the agglutinating titre by test-tube method, when diluted, the serum failed to cause agglutination of the sheep cells on the slide.

Four medical laboratories in Colorado Springs, Colorado, experimented to determine the accuracy of a three minute centrifugation method. The technique involved the use of two racks with eight small test tubes in each, physiological saline solution, inactivated patient's serum, fresh 2% washed sheep cell suspension. The serum was inactivated at 56 degrees Centigrade for thirty minutes. Oxalated sheep cells, not over nine days old, were prepared as 2% cell suspension in physiological saline the day of the test.

Into the first test tube were delivered 0.4 milliliter of saline and 0.1 milliliter inactivated serum. The remaining seven tubes received 0.25 milliliter saline and 0.25 milliliter of solution from each preceding tube to dilute the serum serially from 1:7 through 1:896. To each tube was then added 0.1 milliliter sheep cell suspension. Examinations for agglutination were made after the following treatment: Rack Number I. a. three minute centrifugation. b. overnight incubation at 37.5 degrees Centigrade. Rack Number II. a. room temperature for two hours. b. refrigeration at 5 degrees Centigrade an additional two hours. c. re frigeration at 5 degrees Centigrade overnight.

The two hour room temperature reading was the control method for the experiment.

Results:

1. Three minute centrifugation reading was identical to the control (two hour room temperature)..... 66⅔%
2. Three minute centrifugation reading was lower by one dilution than the control..... 11%
3. Three minute centrifugation reading was higher by one dilution 16%
4. Overnight incubation hemolyzed the cells.....100%
5. Refrigeration for two hours was higher than the control by one dilution..... 22%
6. Refrigeration for two hours was identical to the control 77%
7. Overnight refrigeration was identical to the control 44%
8. Overnight refrigeration was higher by one dilution 55%

Conclusion:

The three minute centrifugation of test-tube serial dilutions has been accepted as an accurate and more rapid method for determining the agglutination of heterophile antibodies.

THE PRESENT TRENDS IN MEDICAL TECHNOLOGY*

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The Status of the Medical Technologist

The Board of Registry of Medical Technologists was established primarily to safeguard the interest of the practicing clinical pathologist, by controlling the activities of laboratory technicians who would be required to meet certain minimum educational and technical qualifications. This act of the American Society of Clinical Pathologists, initiated in 1928, has led the way to professionalization of laboratory workers, who had held no defined status in the practice of medicine up to that time. Largely through the guidance of the Registry the medical technologist found his place in the practice of laboratory medicine and justified his claims for professional status. A profession, peculiarly adapted to men and women of intelligence, often with humanitarian interest, it has come to attract increasingly more and more college graduates in recent years, a fact which has in itself contributed toward the enhancement of qualifications and the elevation of professional status. Thus, an increasing number of college graduates are being found, today, among Registered medical technologists, despite the Registry's reluctance to elevate the minimum requirement for registration to full 4-year college work. At the same time, a large number of medical technologists are becoming conscious of the inadequacy of their basic science to cope with the increasing demand for the more exacting and complex technical procedures currently employed in the modern clinical laboratory, and for the part they must play in the educational program of the general hospital. The clinical pathologist has come to realize, as have the leaders among medical technologists, that the modern clinical laboratory cannot be efficiently maintained and the practice of clinical pathology made complete, without the services of more medical technologists who possess an adequate college background or a higher degree in medical science, who understand the basic principles of laboratory procedures, are able to command independent technical judgement, and can satisfy alert young clinicians who are trained in the fundamentals of complex scientific procedures. There is a desperate need for higher grade medical technologists trained to meet the modern system of laboratory diagnosis and shoulder

* Read before the meeting of Directors of Schools of Medical Technology, A.S.C.P. Oct. 17, 1950, Chicago, Illinois. Fourth of a series of papers on Medical Technology.

the responsibility of teaching the students. An advanced course of training for medical technologists of this type should be outlined at an early date.

It is evident that the two college years required by the Registry are barely sufficient to make a discriminating medical technologist. Indeed, the notion that the Registry's certificate makes a qualified medical technologist is true only in a limited sense. True, such a technician is still indispensable and constitutes the backbone of the modern clinical laboratory, in the same sense the well trained soldier is the bulwark of an army. The success of the practice of clinical pathology depends largely upon him. A far larger number than the present annual output of medical technologists of this type are in immediate demand. How to produce them in greater numbers is the immediate concern of the clinical pathologist, on whose initiative its solution must depend. There are listed 433 training schools, approved by the American Medical Association. Probably twice as many clinical pathologists are not engaged in the training of medical technologists. Therefore, the immediate step would be to enlist many of these to interest themselves in the training program, according to the essentials laid down by this Society and the Council of Medical Education and Hospials of the AMA. Since the average clinical pathologist is far too occupied in his primary duty to undertake the added burden of technician training, he should delegate a large share of the responsibility to qualified medical technologists who can devote time and talent to the task.

To combat the shortage of medical technologists further, it has been suggested to create laboratory workers of a lower grade who may be trained to relieve the medical technologist of the burden of simple mechanical labor. The Registry has already recognized a class of "Laboratory Aide" whose qualifications are not as yet clearly defined, except that they should be high school graduates. Some advocate a certain amount of didactic teaching in elementary basic medical sciences, and a year of practical training in a recognized hospital laboratory. Others believe a year of simple apprenticeship training without formal classroom lectures to be adequate. Simple mechanical phases of the routine laboratory work could be entrusted to these aides, freeing the medical technologist to devote his time to the more exacting parts of the procedures. Or, they may be employed in private physicians' offices to render simple routine laboratory service. Except in the latter instances, these aides should be employed under the medical technologist, serving as assistants. Justifiable fear is expressed, however, least these laboratory aides should usurp the function of the professional medical technologist, or compete with him in securing employment. Proper regulation and sharp vigilance, supplemented by enlightenment of the

medical profession, should do much to eliminate this fear which comes chiefly from the Registered medical technologist, who must take the initiative to indoctrinate them in order to control the situation. If, on the other hand, the situation should reach beyond control, it might lower the present high standards of laboratory service, and the result may duplicate the experience reported by Belk from Pennsylvania, where high school graduation had been the entrance requirement in all its leading training schools until in recent years, or by Shuey and Cebel in the U. S. Army Laboratories which train enlisted men of high school level in laboratory procedures. It would seem that training in mechanics of laboratory procedures alone could be accomplished without didactic instruction, which tends to make these aides feel prematurely "scientific", and to forget their primary function of being mere manual helpers to the medical technologist. If this concept could prevail, the medical technologist should entertain no apprehension regarding competition from this source.

The clinical pathologist must realize that the successful practice of his specialty involves the employment of technical workers of varying degrees of preparation and attainment. The creation by the Board of Registry of new classes of registrants with special qualifications meets the situation partly. However, in the light of the present needs, a further modification of the present classification seems indicated; namely, (1) the professional class or the Senior Medical Technologist who holds a college degree, including the college trained specialist: (2) the intermediate class, or the Junior Medical Technologist who meets the Registry's minimum requirements, and who may be elevated to the senior grade by fulfilling certain requirements: and (3) the non-professional class, or the laboratory aide who is trained primarily to serve as routine assistant to the medical technologist.

The situation leads to the conclusion that the practice of medical technology today, with its complex problems, can no longer be adequately controlled by the clinical pathologist alone. The active and intimate co-operation of the medical technologist must be encouraged and his leadership and initiative must be solicited, if the clinical pathologist is to meet these problems successfully. The amendment to the Society's constitution, which now permits three representatives of the American Society of Medical Technologists to serve on the Board of Registry, is an initial step toward the realization of this concept.

Schools of Medical Technology

It has long been realized that the system of inspection and

approval of schools of medical technology is inadequate. Some of the approved schools are known to continue to ignore certain provisions of the requirements laid down by the Council, and adhere to a poorly organized apprentice system of training. Even today, some directors and clinical pathologists may unhesitatingly admit that students are taken in to relieve the burden of graduate medical technologists or to economize on the payroll. The difficulty has been due partly to the lack of effective means of control and standardization of the training program, other than the mere system of inspection and approval, and partly to the lack of time for the clinical pathologist to direct the training program properly.

To obtain further light on this problem, a questionnaire was sent to 300 recently registered medical technologists to gather expressions on certain pertinent questions related to their training. Unfortunately, only 85, or less than 30 per cent, returns have been obtained, which cannot be considered statistically adequate for analysis. However, a few valuable data are derived from the answers, although the opinions expressed by these graduates, in many instances, appear to have been inspired. Then, too, a large number of them seem reluctant to divulge their honest estimate of the course offered by their alma mater. 58 per cent (48) of the schools require either the four-year college work for admission, or three years in college plus a year of training leading to a bachelor's degree. The remaining 43 per cent (37) still require only the Registry's minimum requirement. The trend seems to be to increase the entrance requirement by an increasing number of training schools. In more than 90 per cent of the schools the medical technologist is in charge of training, although the pathologist acts as the director of the school. This clearly indicates that the actual responsibility of training falls upon the medical technologist. The length of the training period is 12 months, with the exception of 6 schools which require 18 months. There is every indication that 6 months of added training makes a better prepared graduate.

The instructor-student ratio varies somewhat within the 1 to 2 limit set by the Registry, except in a few University schools and small clinical laboratories, where the ratio rises to 1 to 3 or 4. A flagrant example is noted in connection with the course offered by a State Board of Health laboratory, in which, according to the informant, the period of hospital laboratory training is 6

months and the remaining 6 months are spent in the State Board Laboratory, and the ratio is 3 to 12, or 1 to 4, with only 3 qualified instructors listed. The fee for the course is $300, and the student feels that he is being exploited.

All laboratories are departmentalized, but the period of training spent in each varies a great deal. My own personal experience favors a longer period of training in the biochemical and bacteriological departments. With few exceptions, the person in charge of a department is a medical technologist, again pointing out that it is the medical technologist and not the clinical pathologist who guides the student. The mode of instruction is not standardized. Lectures are given in a majority of the schools—just how often is not clear. Some classes are held with medical students, others with nurses. Some claim one or two hours of lecture daily; others one or two weekly; still others only a few hours, or none at all during the entire period of training. Quiz periods, reading assignments and demonstrations are given; how systematically is not explained. The students are allowed to perform the function of a graduate technologist under supervision and few feel they are being exploited, contending that that is the only way to gain experience and confidence. Yet, an impression is gained that a few laboratories seem to rely upon the students to supplement the employed technologists who are expected to carry a greater burden of responsibility than they alone could assume.

Registry examination is required in 30 schools, and optional in 43. The hours on duty average 44 hours a week, with a few less than 40 hours, and 10 of them over 48 hours, with the maximum of 80 hours. Why the student should be required to work so many hours is not answered but seems obvious.

In spite of these shortcomings, only 7 expressed their dissatisfaction with the instruction received The explanation may lie in the fact that the average graduate is too young in the field really to know any better. It is up to the directors to offer remedy when it is indicated.

Finally, to mention a few of the comments, suggestions and complaints voiced by these recent graduates would seem enlightening. They include: The need for a standardized method of teaching, more qualified instructors, the employment of more registered medical technologists, the elimination of students instructing their fellow students, more formal lectures, to know the whys of the procedures as well as the hows, and the correla-

tion of theory and experience with the significance of the tests, the adequate instruction in uncommon tests and procedures and how to use periodicals, a few lectures on laboratory mathematics, and the opportunity for specialization.

All of these observations indicate convincingly that the modern medical technologist, conceived, reared and guided by the clinical pathologist, is no longer a dependent and powerless child, but an intelligent professional who thinks for himself and knows what he wants and what is expected of him, and is anxious to render the best possible service to the clinical pathologist by being a well prepared medical technologist. Under these circumstances, the clinical pathologist can no longer dominate the field which the medical technologist claims as his own.

DISCUSSION

Medical technology is an independent and dignified profession dealing with the technical aspects of laboratory diagnosis. The modern medical technologist is no longer a laboratory technician of the pre-Registry or early Registry days. He is a responsible member of a team in medical diagnosis and is thoroughly indoctrinated as to his proper place in the practice of medicine and in the Code of Ethics. The traditional attitude of the clinical pathologist toward him, namely that of the parent toward the child, on which the original concept of the Board of Registry was largely based and which has guided its policies toward him, must now be altered. He should be recognized as the master of his own professional destinies and given freedom to establish his own professional standards and define his qualifications. The medical technologist is as fully aware as the clinical pathologist of the urgent needs of the day in the field of laboratory diagnosis. He is, likewise, vitally interested in the proper training of future laboratory workers and is ready and eager to contribute his share to the undertaking. Indeed, the medical technologist is the key figure in the training program of future technicians. Not only should he be enlisted as a full partner of the clinical pathologist in this important task, but given a larger share of responsibility in its prosecution.

CONCLUSIONS

1. A close co-operative program should be developed between the American Society of Clinical Pathologists and the American

Society of Medical Technologists, whereby the function of the Board of Registry be so revised as to make it a central clearing agency and an advisory body, eventually under the majority control of the medical technologist and to create individual state or district Registries, established and maintained by local societies of medical technologists to assume much of the routine work of the present Registry, giving them the responsibility of directing their own professional affairs.

2. The direction of the schools of medical technology should be made a joint responsibility of the clinical pathologist and the medical technologist, the latter assuming a greater share of the burden in planning and executing the teaching program. A means should be developed to enable those engaged in the training of medical technologists, including not only clinical pathologists but medical technologists and instructors of basic medical sciences to periodically exchange ideas and discuss methods of conducting a course of training for various types of laboratory workers. This would be a most practical way of improving the present system of training medical technologists and contribute toward strengthening the current practice of inspection and approval.

3. To attain these objectives, the creation of a joint commission composed of representatives from the two societies, to study the problems of mutual concern and render report on the results of such study with recommendations, seems in order.

To summarize briefly: The place of the medical technologist in the practice of clinical pathology should be re-evaluated. The medical technologist should eventually be able to direct his own professional destinies. He should be recognized as a full partner of the clinical pathologist in the enterprise of training future medical technologists. These seem to be the present trends in medical technology which challenge the clinical pathologist.

REFERENCES

1. Belk, W. P. and Sunderman, F. W.: A Survey of the Accuracy of Chemical Analyses in Clinical Laboratories. A. J. Clin. Path. 17:853, 1947.

2. Shuey, H. E. and Cebel, John: Standards of Performance in Clinical Laboratory. Bull. of the U. S. Army Medical Department, 9:799, 1949.

3. Ikeda, Kano: Twelve Years of Registry and Its Contribution to Medical Technology. A.J.M.T., 6:222, 1940.

4. Ikeda, Kano: Specialization in Medical Technology. A.J.M.T., 10:159, 1944.

5. Ikeda, Kano: The Future of Medical Technology. A.J.M.T., 12:146, 1946.

ROSTER A.S.M.T. MEMBERSHIP

Would you be interested in a Roster of ASMT members? If so, please send us a post card to that effect. Printing costs have increased markedly so if we print a roster we shall not be able to distribute it among our members free of charge. There would have to be a price set which would be in accordance with printing costs. This might be as much as $4.00 or $5.00 for the entire roster. In considering whether or not you are interested in the roster, consider also whether or not you would be willing to pay this sum for a copy.

Another point concerning a roster is the fact that address changes among our members are so frequent that a roster which would go to press this month would have perhaps a hundred or more changes before it comes off the press and is ready for distribution. This fact, together with the fact that our membership increases by something like 100 persons monthly means that a roster printed now is obsolete within three months. We have an alternative. If we do not print a roster, state officers may obtain copies of their on lists upon request. These are the addressograph lists of the names of members in good standing (The state treasurers have already received their copies). Other individuals may obtain them upon request and the payment of a small fee we must pay to the individual who makes up the addressograph list as these must be taken care of over and above the regular work in the Office. The labor cost for an entire addressograph list of ASMT members would amount to perhaps $7.50. There is no charge, of course, for the lists made up for the individual state societies through their offices as that is a part of the Executive Office's regular duties.

NOTE NEW ADDRESS:

Executive Office, A.S.M.T.
Suite 25
Hermann Professional Bldg.
Houston 5, Texas

ABSTRACT

PHOTOELECTRIC DETERMINATION OF PROTHROMBIN TIME: by Samuel Losner, M.D., Bruno W. Volk, M.D., Mendel Jacobi, M.D., F.A.C.P., and Stanley Newhouse, B.S. (from the Division of Laboratories of the Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn, N. Y.). Jour. Lab. and Clin. Med. 36, 473, (Sept.) 1950.

The initial steps of the one-stage Quick method are followed to the point: 0.1 cc of plasma and 0.1 cc of fresh thromboplastin are placed into a 37° C. water bath for ten minutes. A cuvette measuring 6 mm in diameter and 7.5 cm long is substituted for the usual test tube, and the cuvette is fitted into the microadapter of the Coleman Junior Spectrophotometer model 6 A. The light beam of the photometer was adjusted to 100% at 610 mu. The cuvette is placed into position in the micro-adapter and then 0.1 cc of M/50 $CaCl_2$ rapidly added to the contents in the cuvette with a blow-out pipette. The stop-watch must be started immediately. Remove the cuvette and shake 3 times very quickly and replace into the adapter. As the light beam moves to the left it will remain at rest until the end point, when again the light beam will move further to the left, at which moment the stop-watch is stopped and the time recorded.

By preparing a dilution chart after the method of Quick using the Spectrophotometer, the prothrombin activity is determined. Cleanliness and the use of freshly prepared reagents are stressed by the authors.

AMONG THE NEW BOOKS

SEROLOGY WITH LIPID ANTIGEN: with Special Reference to Kahn and Universal Reactions. By Reuben L. Kahn, M.S., D.Sc. 327 pages, 27 charts, 77 tables. The William and Wilkins Company, Baltimore. 1950. Price $6.00.

Lipid antigen in Serology is passing from the experimental phases into the investigative stages which possess unlimited potentialities for extending the current knowledge of immunity to lipids. The use of lipid antigen in serology in diseases other than syphilis has great promise for results of practical value. With these facts in mind, Dr. Kahn has been able to set forth his contributions to this very important field of lipid antigen research.

This book has been prepared in four parts: I. Introductory; II. Serology with Syphilis with Kahn Procedures; III. Technique Procedures; IV. Practical Aspects of the Universal Reaction.

Throughout this text, the author has endeavored to present those broad aspects of serology which are of especial interest to physicians, biologists, serologists and various public health workers.

Depite the complexity of various portions of the subject, the book is readable, well-written and another "must" for serologists, student serologists, and schools of medical technology.

THE USE OF CHEMICAL TESTS FOR ALCOHOL IN LAW ENFORCEMENT. By Glenn C. Forrester, Ph.D., Manager, Intoxication Association, Niagara Falls, New York. 91 pages, 2 figures. Charles C. Thomas, Springfield, Ill. 1950. Price $2.00.

This publication is number 50 in the American Lecture Series, founded by the publisher, Mr. Charles C. Thomas. The point of view of the author is that of a law enforcement officer and his various problems in apprehending the drunken driver.

Chemical tests are given, outlined and evaluated.

Medical technologists interested in and dealing with this problem will find in this timely small volume much practical and useful information.

In the opinion of the reviewer it is among the books which should be required as collateral reading for student medical technologists. Interns in hospitals should also find this volume of practical value.

THE PHYSIOLOGICAL BASIS FOR OXYGEN THERAPY: Julius H. Conroe, Jr., M.D., and Robert D. Diggs, M.D. 85 pages. Charles C. Thomas, Publisher. Springfield, Ill. 1950. Price $2.00.

This little monograph appeared as the forty-second publication in the well-known American Lecture Series founded by the publisher. The utilization of oxygen by man is presented admirably—both in health and disease. Oxygen as a toxic agent is also discussed.

Although written for physicians, this little volume will be found to be worthwhile reading by those medical technicians who have the native desire to enhance their knowledge concerning normal physiologic processes.

ELECTROPHORESIS IN PHYSIOLOGY. By Lena A. Lewis, Ph.D., 3 tables, 5 figures, 66 pages. Charles C. Thomas, Publisher, Springfield, Ill. 1950. Price $1.85.

Electrophoresis is no longer a procedure limited to certain especially endowed institutions. The apparatus is not only available to large research foundations but is now becoming a practical means for investigation in large teaching institutions, large hospitals by virtue of its availability. As a new method to be used in understanding many of the pathologic processes in terms of deranged physiology, the electrophoretic technic offers many possibilities for practical application.

Dr. Lewis has certainly explained the basic physical principles and the methods of practical value in this most timely monograph, as well as summarizing many of the potential possibilities of the electrophoretic technic.

For those who are unacquainted with the subject, the reviewer suggests that this book be purchased as an investment in scientific knowledge for use in the near future as a part of protein studies which are among the leading scientific investigations of today.

CYTOLOGIC DIAGNOSIS OF LUNG CANCER: Farber. 77 pages, 60 illustrations. Charles C. Thomas, Publisher. Price $6.00.

This timely monograph has been written for clinicians and cancer investigators. Those medical technologists engaged in cytological work will find the chapter on "Techniques" invaluable. The technology presented in this chapter should become a part of every standard curriculum in schools of medical technology.

The volume has been written by a group of investigators who enjoy an enviable experience in the field of cancer research and the technics which they recommend for cancer diagnosis by cytologic methods has been elicited from the experience of several investigators whose aim has been to produce a satisfactory method for lung cancer diagnosis based on the principle of the technic of Papanicolaou and his co-workers.

Authentic faithfully reproduced colored plates enhance the value of this book.

TO THE MEMBERS OF THE AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS:

For the past five years it has been my privilege to serve you as your Book Review and Abstract Editor. Recently certain problems have arisen which make it impossible for me to remain on the Editorial Staff of the American Journal of Medical Technology and therefore, my resignation is respectfully submitted, effective July first, 1951.

Clara M. Becton

THE GAVEL

Many of you will soon be having your state conventions, and your national officers are most eager that you give some time and thought to your national society while you are so assembled. This issue of the Journal carries the reports of two committees which should receive your very special consideration: Nominations and Elections, and Constitution and By-Laws. Since your delegates to the national convention will represent you in voting on the disposal of these two reports, it behooves you to see that they are discussed and your delegates are instructed as to the desire of your group. These are highly important matters, and the voting should be the reflection of careful deliberation; if you see to it that your delegates are well prepared, there will be no uninformed delegates in Swampscott.

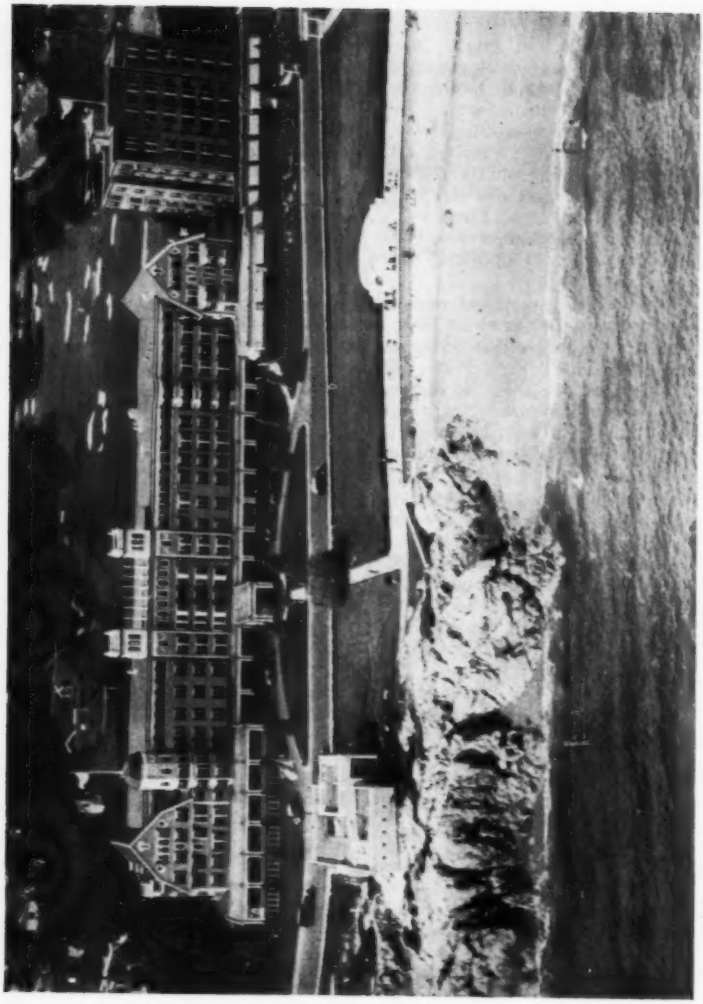
Your officers are trying to prepare an inclusive and orderly agenda for the House of Delegates in June; if you have any item of business which should come before that body, please send it to me right away, so that it may be included. Insofar as possible we shall inform you in this column of all pending business, so that you may consider it well before you leave home or express yourself to those who will represent you. In order to do this, the agenda must be completed before April 10, the dead-line date for inclusion in the May Journal, so send in your suggestions right away, please. Only business arising after April 10 will be allowed introduction from the floor, so **get your place on the agenda now.**

A recent Board action ear-marked a small fund to be used as a Loan Fund from the national treasury. These loans are to be made to affiliated societies for use in incorporation proceedings or in organizational emergencies, and may be obtained by applying to the chairman of the Board. The application should be made by the society president and should state the amount needed, the purpose for its use, and the length of time for which it is to be loaned. It will be sent to the members of the Board for action.

Many of you will be interested to know that your society has applied to the American Association for the Advancement of Science for affiliation. When the advantages of such affiliation were brought to the mind of the Board by your committee on Public Relations, a list of similar groups was also presented by them, and our Executive Office is now investigating the possibility of our affiliating with these. A final report on these matters will be made in Swampscott.

I wish there were room to tell you here of the wonderful work of all your committees this year; it is really a pleasure to work with individuals who do so much so well and so willingly. I can assure you that the reports of the committee work, presented in June, will be most interesting. Besides all the work of the year, each committee is preparing a workshop for our convention; they will be veritable geysers of information and most helpful to the corresponding state committee personnel. If your state chairmen can't attend, why don't you plan to go to Boston and get it for them? You'd have a wonderful time and hear exceptional papers and meet a lot of grand people; it's an opportunity for a vacation-vocation combination you'd never forget.

V. J. S.



The New Ocean House, Swampscott, Massachusetts
A.S.M.T. Convention, June 24-28, 1951

WE CORDIALLY INVITE YOU TO ATTEND YOUR NATIONAL CONVENTION AT THE NEW OCEAN HOUSE, SWAMPSCOTT, MASSACHUSETTS, JUNE 24-28, 1951

All of the New England States have accepted to be co-hostesses and will be there to welcome you to your 19th National Convention at the homey New Ocean House in Swampscott, Massachusetts, June 24-28.

Come and enjoy our Atlantic Ocean, Saturday Night Bean Supper on Tuesday Noon, a Quiz Program with prizes, an Indoor Clam Bake and an Outdoor Beachparty, a Supper Banquet—and all in the North Shore's Vacation Land. We'll be looking for YOU.

Elinor Judd
General Chairman

Program Committee Report

Your Committee would like to give you a preview of some of the outstanding guest speakers who will attend your Convention. These speakers were selected as a result of your interests as indicated from your letters this past fall.

William A. Hinton, M.D., Professor Emeritus of Bacteriology and Immunology, Harvard Medical School, Physician-in-Chief of Clinical Laboratories, Boston Dispensary, and Chief, Massachusetts State Wasserman Laboratory, will discuss "The Value of Serologic Tests for Syphilis."

Louis K. Diamond, M.D., Associate Professor of Pediatrics, Harvard Medical School, Director of Hematology Research Laboratory, Director of the Blood Grouping Laboratory, Children's Medical Center, Boston, will speak on "Blood Groups and Blood Group Antibodies."

"New Advances in the Determination of Prothrombin" will be the subject of Benjamin Alexander, M.D., Assistant Professor of Medicine, Harvard Medical School, Associate Director of Medical Service, Beth Israel Hospital, Boston.

Sydney S. Gellis, M.D., Physician, Children's Hospital, Boston, Assistant Professor in Pediatrics, Harvard Medical School, Pediatrician-in-Chief at the Beth Israel Hospital, Boston, and Consultant in Pediatrics to the Joslin Clinic, will present "Homologous Serum Hepatitis; an Occupational Hazard to the Medical Technologist."

"The Present Status of Cortisone and ACTH" will be the subject of Theodore B. Bayles, M.D., Clinical Associate in Medicine at Harvard Medical School, Associate in Medicine, Peter B. Brigham Hospital, Boston, Research Director, Peter B. Brigham Hospital, Boston.

Alice T. Marston, Ph.D., Assistant Professor of Microbiology at Boston University, will talk on "Fungi—Fact or Fancy for the Medical Technologist."

George G. Jackson, M.D., Research Fellow, Thorndike Memorial Laboratory, Boston City Hospital, Research Fellow in Medicine at Harvard Medical School, will discuss "The Sensitivity of Bacteria to Antibiotics."

Geneva A. Daland, B.S., Research Laboratory Technician in Hematology, Thorndike Memorial Laboratory, Boston City Hospital, will present "What can we learn from a blood film?"

Louis Weinstein, M.D., Associate Professor of Medicine, Boston University School of Medicine, Lecturer in Infectious Diseases, Harvard Medical School, and Chief of Service at the Haynes Memorial Hospital, Massachusetts Memorial Hospitals, Boston, will discuss some phase of Bacteriology.

Frank Gardner, M.D., of the Peter Bent Brigham Hospital, Boston, will discuss some phase of Hematology.

Priscilla White, M.D., Physician, New England Deaconess Hospital, Boston, and Instructor in Pediatrics at Tufts Medical School, will present "The Importance of a Laboratory in the Management of Diabetes."

The Argonne Laboratory will present a panel discussion on the "Medical Technologists and Atomic Disaster."

Because of the tremendous enthusiasm and interest shown in the Workshops last year in Houston, we are trying to schedule them so that in so far as possible they will not be running concurrently. Please be sure to fill in the page at the end of the Journal and send it to the Program Chairman, Helen Madden, 86 Jersey St., Boston, Mass., so that the workshops may be incorporated in the program in such a way that the majority of persons will be able to attend those in which they are particularly interested.

Helen Madden
Program Chairman

Registration Committee

The Registration Committee requests that NO money be sent to the committee prior to the Convention. If any money is received which needs refunding, all refunds will be made after the Convention.

Dorothy Keller
Registration Committee Chairman

Entertainment Committee

Do you remember the "shot that was fired that was heard around the world"? And how about, "one if by land and two if by sea"? If you remember the story of the Battle of Lexington and Concord, and the Old North Church where the lantern was hung to warn of the Red Coats coming, we'll give you an A. But better still, on Sunday, June 24, you will have an opportunity to visit these historic spots in Boston, Lexington and Concord.

Sunday evening from 8-10, there will be a Reception. Plan to meet your old friends there. And remember you will make some new friendships, too.

On Monday, June 25, a Colonial Breakfast will be held in the dining room at 7:40. A Country Dance or Cards, if you prefer, will be held in the evening.

Tuesday shows some Yankee ingenuity—a Saturday Night Baked Bean Supper at noon. The evening program will feature Verne Williams of WBZ in Boston as Master of Ceremonies of the Cinderella Weekend Program.

The famous port of Gloucester will be your destination on Wednesday afternoon. One part of the trip will be by boat and the other by bus. This is a wonderful opportunity to see the well known North Shore. And when you get back—a Clam Bake will be waiting—one that cannot be surpassed.

The annual Banquet will be held Thursday evening with John Nicol Mark, Scot humorist, as guest speaker.

We guarantee we'll send you home happy and favorably impressed with New England.

Marion D. Alcott
Entertainment Committee Chairman

Hospitality and Transportation Report

Hospitality is eagerly awaiting all of you good people who are planning to attend the 19th Convention. To facilitate transportation from Boston to the New Ocean House, please send the time of your arrival in Boston and the way you are traveling—train, plane, or bus—to Miss J. Clare MacDonald, 45 Algonquin Street, Dorchester, Massachusetts. Buses will be provided to take you to Swampscott when groups arrive in Boston.

J. Clare MacDonald
Hospitality and Transportation Committee

Scientific Exhibits

If you haven't reserved booth space for your scientific exhibit, please do so soon. Plan to share the advancement of scientific research with your fellow workers.

Mary Malloy
Scientific Exhibits Chairman

SEE LAST PAGES OF JOURNAL FOR MORE CONVENTION ANNOUNCEMENTS

FILM RELEASES

Below are synopses of films just released by the Audio Visual Production Services, U. S. Public Health Service, Medical Director in Charge, Communicable Disease Center, 50 Seventh St., Atlanta 3, Georgia. The second is of special interest to the medical technologist.

CDC 4-100.0—THE EPIDEMIOLOGY OF INFLUENZA

16mm, sd, B&W, 12½ min., 450 ft., released 1950

Purpose: To present an epidemiological study of influenza and tell the story of accomplishment in the fight against influenza since the pandemic of 1918.

Audience: Members of the medical profession, medical students, laboratory technicians, and nurses.

Content: A documentary type film showing: The historical significance of the influenza; the clinical picture; the behavior and periodicity of influenza; program of World Health Organization with regard to the disease; establishment of lookout posts; physicians' role in reporting outbreaks and preventing recurrence of pandemic; collection of pathogenic specimens; and laboratory procedures.

Comment: A companion film is CDC No. 4-101.0, THE LABORATORY DIAGNOSIS OF INFLUENZA.

CDC 4-101.0—THE LABORATORY DIAGNOSIS OF INFLUENZA

16mm, sound, B&W, 13 min., 479 ft. Released 1950

Purpose: To depict the step by step procedure in the laboratory diagnosis of influenza.

Audience: Laboratory technicians.

Content: The film gives the reasons and techniques for the following procedures: Collection of nose and throat washings and acute and convalescent blood specimens from the patient; the isolation of the virus by means of intra-amniotic inoculation of chick embryos with the nose and throat washing inoculum and subsequent harvesting of the amniotic fluid; rough agglutination tests to determine the presence of the virus, followed by titration to determine its quantity; identification of the strain of the virus by hemagglutination tests with immune sera; and the establishment of antibody content from the acute and convalescent blood specimens.

Comment: A related film is CDC No. 4-100, THE EPIDEMIOLOGY OF INFLUENZA.

REPORT OF THE COMMITTEE ON NOMINATIONS AND ELECTIONS

The following members of the American Society of Medical Technologists will be presented for the vote of the House of Delegates at its annual session on June 27, 1951, at Swampscott, Massachusetts.

President-elect (one to be elected)

Sadie Cartwright, MT (ASCP), 606 East 51st St., Savannah, Georgia; Member ASMT since 1945; Member Advisory Council ASMT, 1948-51; Delegate ASMT 1949-50-51; Charter Member Georgia SMT; President Georgia SMT 1948-49, 1949-50, 1950-51; Member Standards and Studies Committee ASMT 1949-50; Chairman Legislation Committee ASMT 1950-51 Panel Member, Membership Workshop ASMT 1950. Presiding Officer of Scientific Session, ASMT Convention 1950. Member Advisory Council Resolutions Committee ASMT 1950.

Mary Nix, MT (ASCP), 4931 N. E. Glison, Portland, Oregon; Member ASMT since 1943; Member Board of Directors 1948-51; Member Public Relations Committee, ASMT; Charter Member Association of Oregon MT's; President Association Oregon MT 1950-51; Past Chairman Association Oregon MT Public Relations, Membership, Recruitment, and Finance Committees; Presented Registry Award Paper 1950 Convention.

Secretary (one to be elected)

Sister M. Clare (Heath) O.S.F., St. Clare's Hospital, New York, N. Y.; Member ASMT since 1944; Co-organizer of Metropolitan Society of Medical Technologists 1949; President Metropolitan Society of Medical Technologists 1949-50; Member Board of Directors of the Empire State Society of Medical Technologists at present.

Sister Charles Miriam (Strassell) S.C., St. Joseph Sanatorium and Hospital, Albuquerque, N. M.; Member ASMT since 1947; Delegate ASMT Convention 1948-49-50; Member Advisory Council 1947-50; Member Membership Committee ASMT 1948-51; President New Mexico SMT 1948-49; Vice-president NMSMT 1949-50; Secretary NMSMT 1950-51; Presented paper at New Mexico Seminar 1948; Presented paper at Annual Convention of New Mexico State Nurses Association on the Rh Factor 1948; Presented paper at New Mexico Hospital Assn. on Blood Banking; Membership Chairman NMSMT 1950.

Treasurer (one to be elected)

Mrs. Ruth U. Clark, MT (ASCP), Plank Road, Waterbury, Conn.; Member ASMT since 1947; President Niagara Frontier Medical Technologists Society 1940-41, 1941-42; Chairman Survey Committee Central Ohio Society Medical Technologists 1946-47; Executive Secretary Ohio Society of Medical Technologists 1948-50; Chairman-Director Civilian Defense Conn. SMT 1951.

Mary F. Eichman, MT (ASCP), 440 Lyceum Ave., Philadelphia, Pa.; Member ASMT since 1940; Recording Secretary ASMT 1942-44; President ASMT 1946-47; Chairman Program Committee ASMT Convention, 1949; Finance Committee ASMT 1947-51; President Pennsylvalia Society Medical Technologists 1942-43; Member PSMT Education Committee 1949-51; Member PSMT Constitution and By-laws Committee 1950-51.

Board of Directors (two to be elected)

Louis DeLaura, Truesdale Hospital, Fall River, Mass.; Member of ASMT since 1944; Charter Member Mass. Assn. Medical Technologists, Inc.; Treasurer Mass. Assn. Medical Technologists; Chairman Civilian Defense Program MAMT; President Southeastern Mass. Assn. Medical Technologists; Alternate Delegate MAMT at ASMT Convention 1949.

Barbara Isbell, 4781 Santa Cruz, San Diego, Calif.; Member of ASMT since 1946; Delegate ASMT 1947-48-49-50; Member Legislation ASMT 1949-52; Speakers Supplies Committee ASMT Convention 1949; Member Resolutions Committee ASMT Convention 1950; Advisory Council ASMT 1949; President-elect California Society Medical Technologists 1948-49; President CSMT 1949-50; Board of Directors CSMT 1947-48-49-50-51; Chairman Legislation and Constitution and By-laws Committee CSMT 1950-51.

Elizabeth Maclay, 1141 9½ Ave., S. E., Rochester, Minn.; Member of ASMT since 1945; Chairman for arrangements for first (organizational) meeting of MSMT in Rochester; Chairman of arrangements for visit of ASMT to Rochester and Mayo Clinic 1948; President MSMT 1950-51.

Gorden S. Starkey, The Meyers Clinic, Philippi, West Va.; Member ASMT since 1948; Treasurer West Virginia Society Medical Technologists 1949-50, 1950-51; Member Board of Directors WVSMT 1949-51; Member Nomination Committee WVSMT; Member Program Committee WVSMT 1950; Presented paper and exhibit at WVSMT Convention 1950.

PROPOSED AMENDMENTS TO CONSTITUTION AND BY-LAWS

The following amendments have been proposed and have been sent to this committee and the Board of Directors for approval. They will be presented for your vote in the House of Delegates at the 1951 Convention. Please instruct your delegates as to your wishes in these matters. We are including comments from the committee and the Board on these proposed amendments.

Amendment to the Constitution:

Article IX, Section 1—Delete Executive Secretary.
Article IX, Section 3—Delete Editor of the Journal.
Article X, Section 1—Delete Executive Secretary.

Reason for proposal: "The above suggestions are on the basis of the Executive Secretary and the Editor of AJMT being an employee (or employees) of ASMT; they may not necessarily be members of the organization. In fact, if a person remained in the office long enough, he could not be eligible for membership in the organization on the present basis, assuming, of course, that the person devotes full time employ to the organization," by failure to pay annual dues.

"Changes in Articles IX and X would empower the Board to appoint a business trained person if it were felt advisable; it would also relieve the apparent discrepancy in the By-Laws which states that all officers are elected annually with stated exceptions (Art. V). This would in no way bar the Executive Secretary from meetings, since as an employee he could be directed to attend all meetings where his records might be consulted or where it would be advantageous to his work to hear discussions, etc. I truly believe these changes were prompted by foresight, not hindsight."

Reason against proposal: "This Executive Secretary office is the most important office in the organization. I would not like to see it turned over to "hired help"; let's keep it in the membership. If it becomes necessary to change the By-Laws to keep the person eligible, then we better change the By-Laws at that time."

"As long as the individual employed as Executive Secretary and/or Editor, is a registered MT (ASCP) and remains in good standing with that body by paying his annual fee, whether he holds a certificate carrying the red seal denoting active participation in Medical Technology or a blue seal denoting a period of five or more years of inactivity in the profession, he is still a registered MT (ASCP). There is no difference made between these two types of certification as far as membership in ASMT is concerned. If on the other hand, this individual were barred from meetings of the Board of Directors, Advisory Council, or House of Delegates of ASMT, he would be deprived of an opportunity to serve the organization in the capacities in which he is employed. We can look at the practice of the Registry of Medical Technologists as an example. In their case, the registrar, although not a pathologist or Medical Technologist, sits in on all business meetings of that body and is in a position to give information when such is requested. Another point, as long as the Executive Secretary and/or Editor is a member of the Society in good standing, the question might arise as to the right to bar that person as a dues-paying person from such meetings when he might be selected to serve his state group as a delegate. In that capacity, he would have a right to speak as an elected representative of his organization."

Amendments to the By-Laws:

Article V, Section 12 be removed and set up as a separate Article headed Executive Secretary. Add to the list of duties—He shall present in person a report to the Board of Directors at their annual meeting preceding the House of Delegates.

Reason for proposal: "The Executive Secretary is not an officer but an employee."

Reasons against proposal: "Same as above disapproval."

Article I, Section 3d. Send in duplicate to the Executive Secretary of this Society a typewritten list of names, class of membership, Registry number of registrants, and addresses of all members with dues paid as provided for in Article III, Section 1 of these By-Laws.

Reason for proposal: "To avoid confusion in trying to check Registry numbers on Master's level class membership."

Article VI, Section 1: In the last sentence of Section, strike out the last five words, "or more than ten delegates." The sentence now reads "No subordinate Society shall have less than one or more than ten delegates." Add in place of the words deleted "On the basis of one delegate for every 25 members of a subordinate Society, a Society of 250 members shall be represented by 10 delegates. For every 50 active members over 250, there shall be one additional delegate. There shall be no limit to the number of delegates based on this representation."

Reasons for this proposal: "We are aware of the fact that those who wrote the By-Laws were attempting to give the states with small membership good representation and also that they wished to put some limit on the size of the House of Delegates. We feel that these aims are not being defeated by this proposed amendment; and yet it will give the states with large membership another incentive to strive for still larger membership."

Discussion: The opinion given is that the House of Delegates is so large now that it makes for quite a bit of confusion. One suggestion has been made that we have a body similar to the Congress, with a House of Representatives and a Senate to balance it.

"Our House of Delegates is large and growing rapidly as membership in new societies increase. Incentive for increased membership should not be based primarily on House of Delegates representation."

"I think this matter needs more thought and discussion. The basic idea in the proposed amendment is good, I believe. In order to prevent an undesirable increase in the size of the House of Delegates which might result, perhaps the number of members per delegate could be increased. I would not favor having two governing bodies, such as a House and a Senate."

"I do not feel that the proposed revision would mean too large a House of Delegates for some time to come. It is possible that it may become too large but I think that a good representation is desirable."

We would appreciate hearing from any one of you as to what you personally think of these proposals. Perhaps with the publication of many opinions, we can reach the desirable results that are best for all of us. Please do write. And when the time comes, instruct your delegates as to your wishes.

We have been glad to serve on this committee and if we can be of any help to others of you, let us hear from you.

Constitution and By-Laws Committee

Miss Margaret Haraway, Chairman, 427 Osler Building, Oklahoma City, Oklahoma
Miss Allyne Lawless, 3420 W. 30th Avenue, Denver, Colorado
Sister Mary Veronica (Ogden), St. Luke's Hospital, Aberdeen, South Dakota
Mrs. Ada Gregory Silor, Box 1106, El Dorado, Kansas
Miss Mary Yeaton, 34 Castle Street, Worcester, Massachusetts
Mr. John A. Mooty, 118 West Third Street, Beaver Dam, Wisconsin

THE SEMINAR FUND

This notice is to inform and remind members of the American Society of Medical Technologists that Seminar Funds are still available. At the October, 1950, meeting of the Board of Registry of the American Society of Clinical Pathologists, a sum of six hundred dollars ($600) was assigned to the Education Fund of the American Society of Medical Technologists.

As formerly stated, the Seminar Fund was designed to provide additional scientific training to Medical Technologists by stimulating the organization of additional scientific meetings. These additional scientific meetings are to be in the nature of short postgraduate courses in some phase or phases of medical technology.

The fund was not intended to defray any of the expenses of the annual state meetings. A seminar and the state meeting are not one and the same thing.

The Seminar Fund may be used to pay for the honorarium of the speakers in instances where speakers might ask for payment. It will pay for the travel expenses of a speaker, for the rental of a meeting hall, films and projector.

The fund is not intended to pay for advertising, entertainment, printing of programs and expenditures of like nature.

It is hoped that Medical Technologists will taken advantage of this splendid opportunity to further their professional training. Several state groups may form a Seminar.

Application forms may be obtained from the Chairman of the Seminar Fund:

Estelle Downer
2737 North Booth Street
Milwaukee 12, Wisconsin

RECRUITMENT

The following materials are available upon request for Recruitment of Medical Technologists:

1. Mimeographed outlines for Career Day Talks; Exec. Office, Suite 25, Hermann Professional Building, Houston 5, Texas. (Available in quantities sufficient for local and district societies, as well as state.)
2. Reprints of an article describing the Registry Office when the examination papers came in last fall. This news item and picture appeared in the Muncie paper. It is available in quantity.
3. Reprints of article, "Labs and Lasses," from February, 1950, issue of SEVENTEEN. (Available in moderate quantities—2-300 per state society)—from Executive Office.
4. Government Bulletin 203, Medical Technicians, may be ordered from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 5c each.
5. "Hospital Careers Call for Courage," a reprint from GLAMOUR. May be ordered from Margaret O'Rourke, Assistant Job Editor, GLAMOUR, 420 Lexington Ave., New York 7, N. Y.
6. A set of standard slides 3¼" x 4" in black and white, depicting medical technologists performing different laboratory procedures. These may be borrowed to illustrate Career Day talks. Postage and insurance will be paid by borrower.

START PLANNING NOW FOR YOUR LABORATORY OPEN HOUSE, April 22, 1951.

HAVE YOU READ YOUR HOSPITAL COPY OF HOSPITAL TOPICS?

ARMY MEDICS CATALOGING RESEARCH SCIENTISTS

Taking a further step in better utilization of manpower, especially that of the scarce and highly technical kind, the Army Surgeon General's Office is cataloging every applicant commissioned in the Medical corps for the purpose of finding those who have training or experience in research.

The Army Surgeon General is interested in knowing just what medical talent is available for research in clinical and investigative work and this takes in the related fields of bacteriology, chemistry, physiology, etc.

The Medical Research and Development Board of the Army Surgeon General's Office has prepared a special questionnaire which is given to selected individuals after they have reported to duty at the Medical Field Service School, Ft. Sam Houston, Texas, where definite assignments are made.

Individuals with particular qualifications in research for which the Army has definite need are being placed in research assignments. The questionnaire of those for whom there is no immediate assignment are held by the Research and Development Board for future openings.

WANTED: Medical technologist for a small laboratory 50 miles south of Cleveland, Ohio. Laboratory has three technologists and one helper. Pathologist in charge. Write, giving complete qualifications to the Wooster Community Hospital, Wooster, Ohio. Send to W. S. Wolfe, Administrator.

OF INTEREST TO OUR READERS

The UNESCO-CARE Book Program has been extended for another year. The UNESCO NEWS tells us that "Contributions in any amount are accepted. Sums under $10 are pooled in the general fund, while donors of $10 or more may designate the institution, country, and category of books." Miss Doris Boon of the ASMT Public Relations Committee, 1588 Ansel Road, Cleveland, Ohio, will take care of forwarding your contribution if you wish to send it to her.

Miss Charlotte Campbell, MT (ASCP), was featured in the SCIENCE NEWSLETTER for June 24, 1950, as a codiscoverer of the use of an Antihistamine against fungus infections. Her photograph appeared on the cover of the magazine.

Navy Commander Mary Sproul, MT (ASCP), another ASMT member, made TIME, Jan. 1, 1951, issue, with her handling of blood bound for Korea. Those of you who attended the national convention in Houston in June, 1950, will have met Commander Sproul.

Katherine F. Dean, MT (ASCP), of the Baltimore Marine Hospital, and Charlotte Campbell, MT (ASCP), Mycologist, Army Medical Center, Washington, D. C., were among those who appeared on the program of the 1951 Bacteriology Schedule for the Baltimore Associated Schools of Medical Technology. Miss Dean was the Coordinator for the course.

The Colorado Department of Public Health invited all members of the Colorado State SMT to attend a Refresher Course held February 26 through March 2 at the University of Colorado Medical School, Denver, and a later short course to be held at the annual state meeting on April 28, stressing the role of the medical technologist in case of emergency. The Colorado State Society had the ASMT exhibit for the 75th Anniversary celebration of the University of Colorado, in January. They also had the Registry Exhibit, and demonstrated laboratory tests performed in the six fields of medical technology.

The University of Kansas also completed a successful Post Graduate Course for Medical Technologists late in January. One hundred sixty-two medical technologists attended all or part of the lectures which were given by such outstanding guest speakers as Dr. J. J. Andujar, Ft. Worth, Texas, Dr. M. M. Brooks, Parasitology and Mycology Section, Communicable Disease Center, U. S. Public Health Service, Atlanta, Ga., and Mr. Ad Harris, Chief, Serology Section, Venereal Disease Research Laboratory, U.S.P.H.S., Chamblee, Ga. We have requested that some of the outstanding papers by the medical technologists be submitted for publication in the AJMT. Annual Convention May 19, 1951, Topeka, Kansas, Hotel Jayhawk.

The 28th Annual Conference of the American Physical Therapy Association will be held at Hotel Colorado, Glenwood Springs, Colorado, June 17-22, 1951.

On February 1, 1951, the following took office with the Washington State Society of Medical Technologists: President, Mrs. Winogene McIntyre, St. John; President-elect, Margaret Farrington, Harborview Hospital, Seattle; Corresponding Secretary, Sister Mary Faith, Spokane; Recording Secretary, Mrs. Gertrude Dole, Olympia. Their next state meeting will be in Spokane, on May 5 and 6. Technologists from Idaho, Montana and Oregon are invited, together with any other ASMT members in that area at that time. There are a number of active local societies in the state which are in line to affiliate with the state group. Among the meetings scheduled are those of the Pacific Northwest Society of Pathologists and the Northwest Region of the College of Pathologists at Tim-

berline Lodge, out of Portland, Oregon, April 6 and 7. Medical Technologists are cordially invited. Miss Ruth Feucht, Chairman of the ASMT Recruitment Committee, has been invited to participate in a Panel Discussion on "What Can Be Done to Stimulate the Recruitment and Training of Medical Technologists." Reservations may be made through Dr. George Snyder, Secretary PSNT, University of Oregon Medical School, Portland, Oregon.

A refresher course will be held on November 1, 2, and 3, 1951, at the University of Washington.

April 13-14, Montana State Seminar and annual meeting, Great Falls, Montana. For information and reservations, write Mrs. Ruth Hovde, Blood Bank, Great Falls.

Miss Clara Becton, MT (ASCP), 47 Sixth St., Petaluma, California, who has edited the Book Review and Abstract Section of the AJMT for the past four and a half years, is finding it impossible to continue. There are those among you who have access to the periodicals and could do a service to your fellow technologists to offer your services to the Journal. This would not be such a burden if shared by several. Write and tell us where your special interests lie. If we could have an Abstract Editor for each branch of medical technology, and others to review the latest books which are sent us by the medical publishing houses, we could be of distinct service to those of our members who do not have our advantages. Won't YOU help?

NOTICE

In June, 1949, it was deemed necessary to increase the facilities of our Executive Office. At that time the Board of Directors ordered a full-time Office set-up and obtained the services of a full-time Secretary-Editor, the AJMT to be edited from the same office. Since this was a new venture, the Board felt it wise to specify that such arrangement be for a period of two years. Next June, that period will be over. The present Board has investigated the set-up of comparable offices in other organizations and has agreed to recommend that our present arrangement be continued. If that recommendation is approved by the new Board, it will be necessary to simultaneously appoint an Executive Secretary-Editor. All applications for this position should be sent to the Chairman of the Board of Directors for 1951-52, Miss Lavina White, MT (ASCP), Pueblo Clinic, Pueblo, Colorado, and should be in her hands not later than May 1, 1951.

CONVENTION ANNOUNCEMENTS

In order that we may know approximately how many people to plan for at each of the entertainment and social events, please fill in the blanks on the opposite page and mail to: Miss Marion D. Alcott, 24 Lincoln Street, Watertown, Massachusetts.

The Registration and Credentials Desk will open at 10:00 A.M. on Sunday, June 24. However, the Information Desk will be open at 8:00 A.M. and will direct you to the church of your choice. There will be Tours to take you on a trip around Lexington and Concord leaving the New Ocean House at 1:00 P.M. This tour will take 5 hours. Or if you prefer, there is a shorter trip through historic Boston lasting 3 hours which will leave from the hotel at 2:00 P.M.

The Advisory Council will hold its meeting at 1:30 P.M. Sunday.

From 8:00 to 10:00 P.M. Sunday, New England will be the hostess to the Convention.

Monday evening, there will be a Country Dance or cards if you prefer.

Tuesday evening, Verne Williams, popular M. C. of the Cinderella Weekend Program on WBZ Boston, will entertain you.

Wednesday, June 27,, a trip to Gloucester—one way by boat and the other by bus. And the dinner in the evening will be a New England Clam Bake.

Thursday, June 28, the Banquet will be held. John Nicol Mark will entertain you with his Scotch Humor.

Prices for these entertainments will be included in strip tickets depending upon which tour of Boston you select. If you take the tour of Lexington and Concord, the total cost will be $15.00. But if you decide to take the tour aruond Boston, then the total cost will be $13.00. Because the Advisory Council Meeting will interfere with the State Presidents and the Executive Board taking the tours, their total cost for the enterainment during the Convention will be $10.00. Individual day registration and entertainment may be arranged.

Hotel Arrangements for June 24-28, 1951

Make your reservations directly with the New Ocean House, Swampscott, Massachusetts. Please give the following information: Name, Address, Date of arrival, Time, Date of departure, Time, Accommodations desired. Designate time desired for American Society of Medical Technologists convention.

RATES	Daily per person including Room and Meals
Double Room with Bath, Twin Beds	$11.00 and $11.50
Double Room with Bath, Twin Beds, Hotel Cottages	10.00 and 11.50
Large Room with Bath, Three Beds	9.50 and 10.00
Large Room with Bath, Four Beds	9.00 and 9.25
Double Room with Running Water, Twin Beds	9.50 and 10.50
Suite, 2 Double Rooms, Bath between, Four Beds	9.75 and 10.50
Suite, 2 Double Rooms Bath between, Six Beds	9.25 and 9.50
Choice Corner or Bay-Window Room, Bath, Twin Beds	12.00 and 13.00
Single Room with Bath	13.00 and 14.00
Single Room with Bath, Hotel Cottages	12.00 and 12.50

If a sufficient number of Sisters wish hotel accommodations, a separate block of rooms will be reserved for them. If need be, a separate cottage will be reserved for them. For Sisters Reservations, write Sister Mary Claire, 415 West 51st Street, New York, New York.

If you find that you must cancel your reservations, write to Miss Mary Duffy, Assistant Manager, New Ocean House, Swampscott, Massachusetts.

Make Your Reservations Today

Workshops

As it has been already stated, we are trying to arrange the Workshops so that they will not be running concurrently. Therefore, would you please check the Workshops listed below that you are most interested in attending and mail them to: Miss Helen Madden, 300 Longwood Avenue, Blood Grouping Laboratory, Boston, Massachusetts.

Finance_____ Education_____

Vocational Guidance and Recruitment_____ Constitution and By-Laws_____

Education_____ Public Relations_____

Legislation_____ Research_____

Membership_____ Standards and Studies_____

Signed:_____

Entertainment

To facilitate the planning of the Entertainment, please check those functions you wish to attend and send them to: Miss Marion D. Alcott, 24 Lincoln Street, Watertown, Massachusetts.

Sunday, June 24:

1:00 P.M. Lexington and Concord sightseeing trip_____
or
2:00 P.M. Historic Boston sightseeing trip_____

8:00 P.M. Reception_____

Monday, June 25:

8:30 P.M. Country Dance or Cards_____

Tuesday, June 26:

8:30 P.M. "Cinderella Weekend" Quiz Program, with Verne Williams as M. C._____

Wednesday, June 27:

1:00 P.M. Boat and bus trip to Gloucester_____

Thursday, June 28:

7:00 P.M. Banquet—Guest Speaker—John Nicol Mark, Scot Humorist_____

Total cost for all social events $13.00 or $15.00 depending upon which tour you select. Individual day registration and entertainment may be arranged.